IDG.net

JULY 20, 1998 VOLUME 15, NUMBER 29

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

GIGABIT ROUNDUP

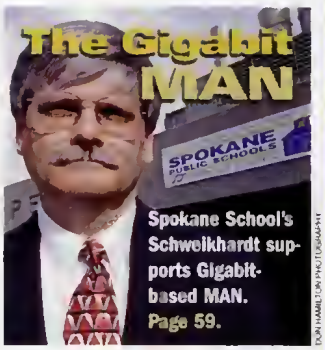
Gigabit Ethernet hits the WAN

By Jim Duffy
Spokane, Wash.

The benefits of Gigabit Ethernet in the LAN are well documented: high-performance, congestion-free connections for enterprise backbones and server farms — all with the familiarity of good old Ethernet.

But Gigabit Ethernet in wide- or metropolitan-area networks? Unheard of, you say. Everyone knows Ethernet isn't a WAN technology.

Don't tell that to the 13 Washington state educational institutions that this week will announce plans to build a wide-area Gigabit Ethernet network supporting voice data and video traffic. The network will use dark fiber provided by a local elec-



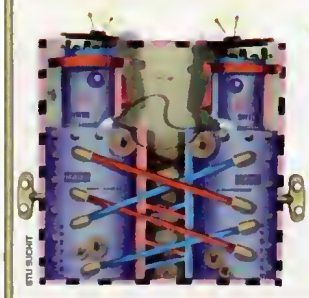
Spokane School's Schweikhardt supports Gigabit-based MAN. Page 59.

DON HAMILTON/PHOTOGRAPHY

See Gigabit, page 60

GOING GIGABIT

Gigabit routing switches can help shore up sagging backbones — if you understand their features and functions. We've got two stories to get you started:


ETU SUCHIT

- A guide to gigabit routing switch architectures that will help you grasp the pros and cons of switch designs and migration strategies. **Page 39.**
- A review of two of the first Layer 4 gigabit switches to hit the market: Berkeley Networks' exponeNT e4 and Alteon Networks' ACEswitch 180. **Page 43.**

NEWSPAPER $5.00

Info appliance revolution is short on ammo

By John Cox

Last year's widely unwatched thriller *The Saint* starred Val Kilmer as a kind of do-gooding, freelance James Bond. He was with-it and wired: A spiffy, and pricey, Nokia 9000 Communicator let him make wireless phone calls, use e-mail and get onto the World Wide Web.

Hollywood can make anything not only look good but perform well — even information appliances. Kilmer's character read the Nokia display with ease, and the system responded to his commands in a snap.

In reality, Nokia users complain about the screen, which isn't backlit, and they say the sleek little device is, simply put, slow. In the real world of corporate computing, these things matter. Real-world demands, for now anyway, make information appliances toys rather than tools.

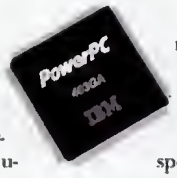
Outside of Hollywood, information appliances can be described as low-cost, easy-to-use

See Appliances, page 14

IBM bakes mgmt. chip

Embedded technology will help net managers more easily monitor the health of their communications devices.

By Marc Songini



IBM wants to take the "hard" out of hardware when it comes to managing far-flung server and communications gear.

The company is building a family of chips to be embedded in network equipment that promises to let customers manage everything from desktop disk space to router ports and hub blades.

And IBM claims it will make the technology widely available to other vendors for use in their devices.

The idea is to provide common management access and information for companies with multivendor platforms. Once in place, the chips could help eliminate the time and money customers spend cobbling together management packages.

This is not the first time IBM has tried to set a management benchmark. In the past few years, the company has touted a standard architecture called the Agent Building Environment, which promises to let IBM and others develop interoperable agent-based management applications.

Another IBM effort, called Agent Applets, or Aglets, uses Java technology to build mobile agents capable of being embedded in

See IBM, page 61

SPECIAL REPORT

The long, strong arm of the NSA

By Ellen Messmer
Fort Meade, Md.

Back in the days of the cold war, Washington insiders used to joke that NSA stood for "No Such Agency." The government denied the very existence of this group, which is dedicated to intercepting and decoding foreign communications.

That was then. Today the National Security Agency is well known, and spends a lot of time leaning on software, switch and router vendors, pushing them to re-tool their products. The agency's goal: to ensure that the government has access to encrypted data.

The industry is facing a year-end deadline to add a government-approved back door into network gear. Vendors that don't provide this access risk losing export privileges.

Cruising up and down Silicon Valley, NSA spooks from the agency's Fort Meade headquarters have been making pit stops at companies ranging from industry leaders Netscape Communications Corp. and Sun Microsystems, Inc. to start-ups such as VPNet Technologies, Inc. in order to get a peek at products still on the drawing board.

The NSA wants software vendors to make sure that any product with strong encryption have some way for the government to

See NSA, page 59

WORK THE WEB.

THe IT DiRECtOR is having heart palpitations in the elevator.

He hates giving speeches. In less than an hour he'll be in front of the entire IT department of the company. Rehearsing his speech in his head, he reminds himself not to forget to mention how successful the implementation of the new [1](employee self-service HR application) has been. The CEO will be there, so he also wants to point out that the [2](server consolidation program) and Y2K project are finished and, most importantly, within budget. The elevator doors open. His [3](pager) vibrates. It's an e-mail from his wife. She asks him to remember to pick up a tin of smoked eel on the way home. He bumps into the lead Webmaster in the hall who tells him that they've been able to take on new projects since they have dramatically [4](reduced the backlog) on Website change requests. He makes a mental note to say something in his speech about how well the Web team is doing. He looks down and sees, to his horror, that he's wearing two different color socks.

THE [5](BEST PARTS) OF HIS DAY WERE MADE POSSIBLE BY LOTUS.

[1]Lotus Notes® HR applications using PeopleSoft.® [2]Lotus Domino™ server performance and scalability. [3]Lotus Pager Gateway with Wireless Access. [4]Lotus Domino developer tools. [5]www.lotus.com/worktheweb

Lotus

An IBM Company

DOING BUSINESS ON THE INTERNET?

Is your patchwork security system keeping you up at night? Sun™ network security software solutions offer rock-solid, end-to-end security that seamlessly blankets your entire enterprise network. So you'll have the confidence to take full advantage of doing business on the Internet. What's more, you're covered by Sun's consulting, education and support services. For proven, flexible security solutions, visit our Web site at www.sun.com/security/ or call 800-786-7638. And put your worries to bed. THE NETWORK IS THE COMPUTER.™

THE BEST SECURITY BLANKET IS BLANKET SECURITY.

UNDER THE UMBRELLA

Peter Van Camp, president of WorldCom's Advanced Networks division, is working to integrate ISP services under one bumbershoot. Page 29.

STEP ON THE GAS

Start-up Softcom Microsystems has rolled out a so-called network accelerator, called the GigaBlade, that promises to speed Internet access by 50%. Page 28.

PINPOINTING PAYBACK

Patricia Benson scrutinizes DCC Technology Management Group's IT investments. Page 45.

JASON GROW

NetworkWorldContents

July 20, 1998 Volume 15, Number 29

News

6 **The incredible shrinking Java** alliance.

8 **XML** gains Web site.

8 **As NT 5.0** slips, so does Exchange Platinum.

8 **Sun's** dream of Jini.

12 **IS must** calm public's Y2K fear. Wall Street holds successful Year 2000 demo as president calls for new law.

12 **Lotus pitches** upgrade bargain to cc:Mail crowd.

14 **3Com** gets ex-Digital exec.

15 **Nortel puts** intranet telephony onto the PBX.

59 **DOJ** approves merger, MCI sells Internet business.

60 **Gigabit Ethernet:** manning the MAN.

Local Networks

19 **Cabletron uncorks** 10/100 SmartSTACK switches.

19 **HP pops** 10/100 switches at $99 per port.

22 **RAScom adds** VPN to NT access repertoire.

22 **Server king** sees red after Digital buy.

22 **Dave Kearns:** Psst . . . just one word.

Internetworks

27 **Cisco** may need partners for voice nets afterall.

27 **IBM puts** new life back into old network gear.

28 **Memotec boosts** video pack; device squeezes video onto frame relay nets.

SPECIAL FOCUS

Network operating systems

Don't mess with NetWare fans. Page 24.

Carriers & ISPs

29 **Qwest** ups legal ante to salvage RBOC deals.

29 **WorldCom** Advanced Networks is blending multiple services into a single IP offering.

30 **Sprint** SLAs back up its Managed Firewall service.

30 **Daniel Briere and Christine Heckart:** Drooling over WAN apps.

Intranet Applications

31 **Moss** to cover new Web data model.

31 **Data warehouses** worth filling.

34 ***USA Today*** Web site balances huge load.

34 **Scott Bradner:** An almost complete site.

Technology Update

35 **Subscriber** Management Systems could grow DSL services.

Management Strategies

45 **Number crunching:** Company peers into technology investments to see if it's getting its money's worth.

Opinions

36 **Editorial:** ISPs, Layer 3 vendors — your time is at hand.

36 **Richard Ptak:** What service management will need to succeed.

37 **Roderick Beck:** Why IP is the future of voice.

62 **Mark Gibbs:** Laugh, but watch out for Uncle Sam.

62 **'Net Buzz:** Resonate, Plumtree rake in venture cash; PointCast finally sobers up.

Net Know-It-All. Page 14.

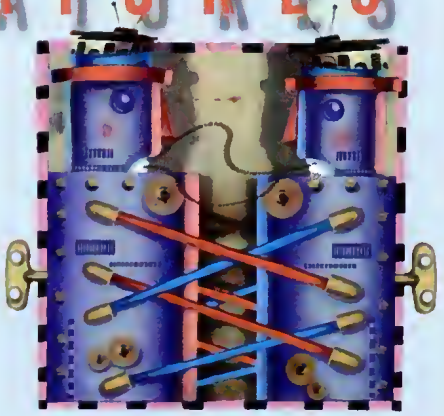
Network Help Desk. Page 35.

Message Queue. Page 36.

Editorial and advertiser indexes. Page 58.

FEATURES

GOING GIGABIT: *A guide to gigabit routing switch architectures that will help you grasp the pros and cons of switch designs and migration strategies.* Page 39.



STU BUCHT

REVIEW: *A look at two of the first Layer 4 gigabit switches to hit the market — Berkeley Networks' exponeNT e4 and Alteon Networks' ACEswitch 180.* Page 43.

FIND IT @ FUSION

To quickly get to any online info referenced in *Network World*, enter its DocFinder number in the input box on the home page.

NetworkWorld Fusion

www.nwfusion.com

This Week

Only on Fusion

Taking stock in IT. This week, Fred McClimans examines the fine line between impartiality and good advice from analysts. **DocFinder: 8052**

Showdown challenge. Check out Editor in Chief John Gallant's editorial on upcoming trade conference showdowns on page 36 Then head online to give us your thoughts. **DocFinder: 8050**

Online support. So you bought your network equipment online. How have the service and support been? Let us know your success and horror stories. **DocFinder: 8051**

More on the NSA. After you read our Page 1 story on the NSA, check out our added sections online, including "Charge it to the NSA" and "The private doorbell solution." **DocFinder: 8046**

The Water Cooler. Our weekly series from the editors of *Network World* looks at the power of intranets. **DocFinder: 8053**

HOW TO GET ONTO NETWORK WORLD FUSION

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

How to contact us

WRITE: Network World, 161 Worcester Road, Framingham, MA 01701; **CALL:** (508) 875-6400; **FAX:** (508) 820-3467; **E-MAIL:** nwnews@nww.com; **CIRCULATION:** (508) 820-7444; nwcirc@nww.com; **STAFF:** See the masthead on page 12 for more contact information; **REPRINTS:** (612) 582-3800.

News briefs, July 20, 1998

Xylan under fire — literally

Xylan's *Kim*

Only security guards were on the premises when a gunman fired four large-caliber bullets into a darkened office window at Xylan Corp. at about 10 p.m. on July 9, according to Douglas Hill, vice president of corporate communications. No one was injured. Hill said the gunman probably shot from a hill across the parking lot from the building, in the usually peaceful Los Angeles suburb of Calabasas. In March, a gunman fired several shots at Xylan CEO Steve Kim as he left the building and got into his car (*NW*, March 9, page 6). Kim was not injured. "We have no reason to believe that [the shootings were] related," Hill said. Xylan implemented security precautions after the March incident, but Hill declined to give specifics. "We have pretty tight security cautions, and we are continuing to tighten them," he said.

Homemade hardware users hack standard security code

Published reports last week said researchers using a homemade supercomputer cracked the government's standard 56-bit encryption code, DES, in a record 56 hours. DES is typically used to secure banking and military communications. The researchers cracked the code and won $10,000 as part of a contest sponsored by data security vendor RSA Data Security, Inc. The researchers, John Gilmore, a computer privacy expert, and Paul Kocher, a cryptographer, assembled their $250,000 computer from readily available chips to prove that supercomputer technology is all too easily available to hackers and other folks with nefarious intent.

Sun to industry: Get off our backs

In a move to ease complaints from competitors and allies alike, Sun Microsystems, Inc. is negotiating with several of the Big Five accounting firms to audit its activities regarding the Java standards process. Sun has been criticized for trying to dictate Java standards while at the same time competing with other companies implementing the technology in their products. The International Standards Organization anointed Sun as a gatekeeper for Java last November, over the objections of Microsoft Corp. and other vendors.

Wildcats loose on the 'Net

Looking to develop that next killer app, Northwestern University, IBM, Cisco Systems, Inc. and Ameritech last week said they would form the Advanced Internet Technology Research Center to work on advanced application design, new network services and boosting network performance. The center, slated to open in late 1998, will shoulder cooperative projects with regional, national and international research and education networks. The research center will have sites on Northwestern University campuses, IBM facilities and the Metropolitan Research and Education Network backbone. The center will also have testbed access to the multigigabit Internet2 Abilene backbone recently announced by University Corporation for Advanced Internet Development, Cisco, Qwest and Nortel.

Reach out and touch an application

In the not too distant future, SAP AG users will be able to access data from the company's R/3 enterprise resource planning software via their Siemens AG telephone networks. This is just one application that will come out of a recent alliance formed between Siemens and SAP. The two German companies last week announced plans to develop products based on computer-telephone integration (CTI) technology, which will link Siemens' Hicom corporate telephone systems with R/3. The companies said up to 60% of SAP's customer base — currently running at 15,000 installations worldwide — will sign on for CTI products.

The incredible shrinking Java alliance

By Chris Nerney and Andy Eddy

A year ago there were four of them, members of a new alliance touting a potent new weapon designed to end Microsoft Corp.'s growing dominance in the computing industry.

Now the Java Gang of Four is the Gang of Two and a Half.

Java creator Sun Microsystems, Inc., of course, is still fully committed to the programming language, as is IBM.

Oracle Corp. continues to work on server-side Java software that can access databases, though it has apparently given up on its Larry Ellison-hyped dream of Java-powered network computers driving PCs off the corporate desktop.

But Netscape Communications Corp., desperate to find a winning business formula, has abandoned nearly all client-side Java development work and appears to be repositioning itself — yet again — as an Internet portal.

Netscape's scrapping of its Java browser efforts and Oracle's reversal on network computers has created confusion about Java's future. These fissures in the Java alliance also play into the hands of the group's dreaded opponent, one analyst said.

"Microsoft loves the fact that there are splinters," said Evan Quinn, an analyst at International Data Corp. in Framingham, Mass.

Quinn said the Java alliance was always one of convenience, subject to the competitive imperatives facing each of its members.

"Oracle's under pressure, Netscape's clearly under pressure, and Sun and IBM are doing pretty well in the marketplace," he said. "Netscape at this point is in no position to be evangelical about Java. They've got to take care of business. They've got to get out of the limelight and into the profit column."

It was a different story last August, when Sun, Netscape and IBM announced that engineers from each of the three vendors would staff the Java Porting and Tuning Center in a bid to hasten the development and deployment of Java software.

"By working jointly with industry-leading partners, we can significantly accelerate the already tremendous momentum behind Java-based development," Netscape CEO Jim Barksdale said at the time.

Flash forward to early this month, when company cofounder Marc Andreessen trashed Java at an enterprise conference in California, blaming poor client-side performance for Netscape's abandonment of its Javagator browser. Though Andreessen notably did praise Java progress on the server side.

Despite Andreessen's comment, Netscape officials claimed they continue to enjoy a healthy relationship with Sun, and vice versa.

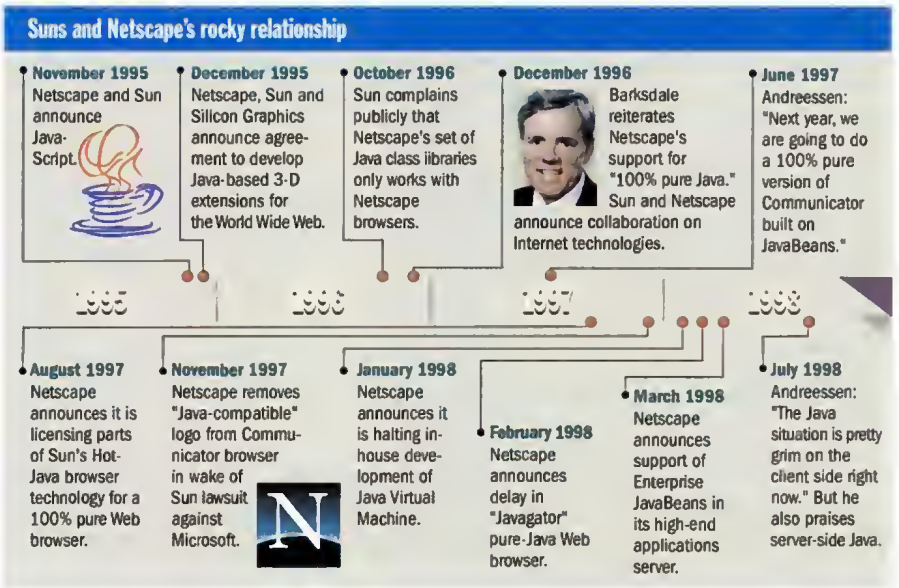
One analyst is skeptical. "I actually don't think Sun and Netscape like each other much; it's more of an alliance against Microsoft," said Rob Enderle, a senior analyst at Giga Information Group, Inc. in Santa Clara, Calif.

If Netscape is no longer an active part of the Java alliance, IBM remains a card-carrying member. "On the development and marketing side, we talk to Sun people every day," said David Gee, IBM's program director for Java marketing. IBM is so dedicated to the Java alliance, the company relocated its Java team to a building adjacent to Sun's JavaSoft division in Cupertino, Calif, he said. Asked if Netscape engineers were working in any capacity with Sun and IBM on Java, Gee said, "I would not say that they are."

The fourth member of the Java alliance is a different story, he said. "We're pretty involved with the Oracle folks," Gee said. "The specification for Enterprise JavaBeans was built with significant contributions from Oracle."

To some extent, Netscape and Oracle have been victimized by their own hype, Gee said. "We never said some of the things that Mark Andreessen and Larry Ellison said — this discussion about network computers in the home, and everyone's going to throw away their PC. There was a certain amount of hype there," he said. "What you're seeing is reality. The hype machine got well ahead of the reality machine." ■

Suns and Netscape's rocky relationship



XML gains Web site ally

By Nancy Weil

A World Wide Web site dedicated to XML has been acquired by a global electronic commerce consortium that plans to use the site as a registry service to ensure interoperability and information exchange among developers.

XML Exchange (www.xmlx.com/), which was launched 10 weeks ago, will now be run by CommerceNet, a nonprofit electronic commerce industry group with more than 500 worldwide members, CommerceNet announced. The Web site was acquired for an undisclosed sum from XML-Solutions LLC, a Washington, D.C., consulting firm.

Extensible Markup Language (XML) was finalized as a standard by the World Wide Web Consortium (W3C) in February and within weeks was hailed as the heir apparent to HTML. A subset of Standard Generalized Markup Language (SGML), XML allows programmers to make it easier to find and index information on the Web.

HTML cannot identify text. That means, for instance, that HTML cannot distinguish when a number is a price. Nor can it determine in a search query the specific meaning of a particular word. As a result, a search of the word "boss" might turn up listings for a model of a guitar, the musical genre bossa nova, Bossier Parish in Louisiana, the Boston Celtics and an antistress page called "My Boss Sucks!" Even trying to pare down the search with more exact keywords will result in wildly disparate listings.

As long as programmers of various Web sites agree on definitions — "price" or "cost," for example — XML-based sites will interoperate.

That ability is seen as having a major effect on electronic commerce in particular (not to mention making it easier to search the Web).

Of course, one hurdle to XML's use is that programmers have to agree on definitions, but the registry service set up by CommerceNet is supposed to help coordinate the definitions. Each definition is written as a tag, which is code contained in angled brackets.

CommerceNet, in Palo Alto, Calif., can be reached at (650) 858-1930 or at http://www.commerce.net/. XML Solutions, in Washington, D.C., can be reached at (202) 434-8379 or at www.xmls.com/.

Weil is a correspondent with IDG News Services' Boston bureau.

As NT 5.0 slips, so does Exchange Platinum

Whether users care depends on who's asked.

By Paul McNamara

Redmond, Wash.

As goes Windows NT 5.0, so goes Platinum, code name for the next major upgrade of Exchange Server, Microsoft Corp.'s messaging platform.

NT 5.0 doesn't appear to be going anywhere anytime soon, at least based on pronouncements from Microsoft and increasingly dismal shipment predictions from industry watchers.

A release in the first half of 1999 is a best guess, but even that may be optimistic.

Whether the concurrent delay of Platinum matters to Exchange customers depends on whom you ask.

At Exchange Conference '97 last October, Microsoft officials told customers and business partners that Platinum would ship two to three months after the release of NT 5.0, which then was expected in mid-1998. Platinum will require NT 5.0 and will utilize Microsoft's much ballyhooed Active Directory, a potential boon for Exchange administrators who have always complained about the messaging platform's lackluster directory services.

Now Microsoft is saying Platinum will ship as many as four months after NT 5.0, which would likely place its release in the second half of 1999, a time when many companies will be focused exclusively on their Year 2000 problems.

"I think the delay is significant, as it is not really clear how the Exchange Directory and Active Directory will interoperate," said Ramesh Viswanathan, a systems analyst at Siemens Corporate Research, Inc. in Princeton, N.J.

Customers who deployed Exchange expecting to quickly transition beyond basic messaging into directory-enabled groupware functions will find those plans disrupted, according to one industry analyst.

Notes and Exchange rule

Here's how the three top messaging products fared in the first quarter and how they are doing overall.

Q1 98 sales (in seats)

Notes:	2.7 million
Exchange:	3.05 million
GroupWise:	300,000

Installed base (in seats)

Notes:	22 million
Exchange:	13.05 million
GroupWise:	8.8 million

SOURCE: ELECTRONIC MAIL & MESSAGING SYSTEMS

"They could very well be in a severe crunch," said Tim Sloane of Boston-based Aberdeen Group, Inc.

Other users are taking the delays in stride, however. "Dow is in the process of upgrading our servers to Exchange 5.5," said Clay Harper, workstation product manager at Dow Chemical Co. "From a basic mail aspect, I think we're in pretty good shape to wait it out

That's the prevailing viewpoint, according to Dave Malcolm, an Exchange product manager.

"Customers are always asking for improvements, and we're certainly looking to deliver those improvements, but we haven't seen a slowdown with respect to Exchange 5.5 shipments," Malcolm said. "Nor have we heard a lot of complaints from our customers about the fact that Platinum will ship 90 to 120 days after NT 5.0."

Microsoft last week made available the first service pack for Exchange 5.5. Included are a number of bug fixes, new collaboration and workflow capabilities and the Outlook 98 client.

Sloane believes the delay of Platinum and Active Directory could cost Microsoft down the road. "The bigger problem is customer satisfaction," Sloane said. "Those companies that made the decision to say, 'Yes, Microsoft, we trust you on an enterprise level and we'll commit to you,' are now stuck between a rock and a hard place."

At least one Exchange customer believes the delays should come as little surprise to IT professionals.

"Anyone who planned on NT 5.0 in 1998 was unrealistic," said Tom Connors, senior member of the technical staff at Texas Instruments, Inc. in Attleboro, Mass.

If Connors is right about the cautiousness with which enterprises are likely to roll out NT 5.0, the production delays for Platinum may prove even longer.

"The fundamental change from Domains to Active Directory says that any release of NT 5.0 would be used for testing, evaluation and prototyping and not for production deployment, except in the smallest of shops," he said. ■

Sun's dream of Jini

By Chris Nerney

Sun Microsystems, Inc.'s latest entry into the network utopia sweepstakes is another cleverly named technology that promises a magical world in which users can "network anything, anytime, anywhere."

Based on the Java programming language, the new technology — dubbed "Jini" — lets Java-based hardware and software devices talk to and work with other devices merely by plugging into the network, according to Sun. This "spontaneous networking, will require no "configuration, driver installation or device installation," Sun proclaimed last week.

Jini consists of a small piece of Java code that links Java Virtual Machines in every device on a network. As each device joins the network, it "announces" its presence and offers its services to the other devices. When the networked devices need to perform a task, they can "look up" services available from other devices and use them without preconfiguration or driver installation.

Sun co-founder William Joy began developing the Jini technology in 1994.

The company is pitching Jini at the market for embedded consumer devices, which analysts forecast will grow to a multibillion-dollar market over the next few years.

Under the Sun scenario, Jini would connect a whole range of Java-based home devices to each other, including PCs, stereos, telephones, printers and digital cameras. This allows many tasks to be performed without using a computer. Thus, a photo taken with a digital camera could be transmitted directly to a printer without first uploading to a PC.

However, Sun also envisions uses for Jini in corporate networks. Under one scenario, a remote employee would be able to plug a laptop into a Jini-enabled network and, using clickable icons on the laptop's display, instantly access a number of printers in different locations, an electronic whiteboard, a calendar manager and a 3-D color projector, Sun said.

If the worker is doing a presentation, he can "drag" the file onto the 3-D projector icon. From there, according to Sun, the projector would seamlessly turn the data into a dazzling multidimensional presentation.

None of this can be accomplished easily today. Hooking up printers to a remote laptop, for example, would require the preinstallation of printer drivers on the device. And remote workers today cannot generally access a device such as a 3-D color projector without assistance from a systems administrator.

A number of hardware and software vendors, including Federal Express Corp. and Computer Associates International, Inc., reportedly intend to incorporate Jini into their products over the next 18 months, with the first commercial releases becoming available in late 1999. ■

More possibilities than you ever imagined in a single box.

Consider the variety of service alternatives and application demands you face today. Wouldn't it be nice to have a single box that lets you choose the best service for each application and, at the same time, saves you money? Now you can, with ATLAS.

ATLAS is a new integrated access system from ADTRAN. Capable of both dedicated and switched access, this versatile host-site platform consolidates voice, data, and video onto a single digital circuit – lowering monthly payouts, optimizing your pipeline and reducing network management to its simplest form. And it's available for a fraction of what most alternatives cost.

ATLAS. It's the only network access solution that covers the spectrum.

CALL 800 9ADTRAN (800 923-8726) FOR A FREE BROCHURE.

www.adtran.com/atlas

T3 • SNMP • T1 • FRAME RELAY • ISDN • REMOTE ACCESS

ATLAS 800
The new integrated access system from ADTRAN

ADTRAN, Inc.
P.O. Box 140000
Huntsville, AL 35814-4000

ADTRAN



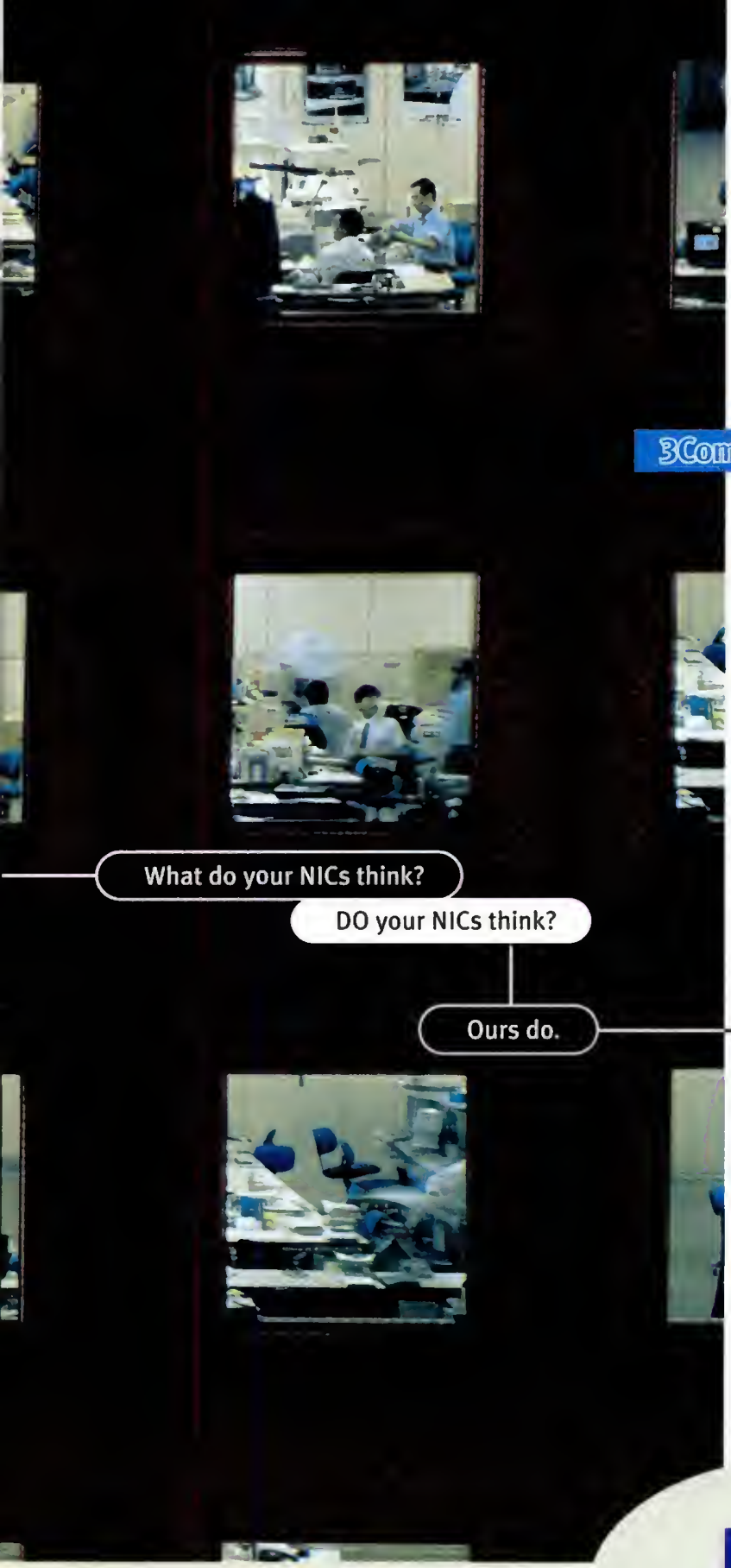

The CEO thinks you could make the company more productive.




Finance thinks it should have priority over Web surfers.

And everyone thinks the network is too damn slow.



Increase your network's IQ with 3Com® Fast EtherLink® XL 10/100 network interface cards. Their intelligent features not only make them an active part of your network, but a productive part of your company.

DynamicAccess® software lets you optimize the performance, control, and management of 3Com Fast EtherLink XL your network. Traffic prioritization gives financial applications priority to close the books on time and distributed RMON allows you to identify bottlenecks. And our Parallel Tasking® II technology provides your end-users with the fastest data throughput in the industry.

What's more, our Managed PC features let you power up PCs remotely for after-hours updates, inventories, installations and repairs, even if a damaged PC cannot boot. All of which increases productivity and reduces costs. (Finance will like that.)

The Fast EtherLink XL 10/100 NIC

Traffic Prioritization.
distributed RMON.
Optimized data throughput.
Remote Wake Up.
Managed PC Boot Agent.
DMI 2.1

To solve your network problems with more intelligence, visit www.3com.com/thinkingnics/nw or call 1-888-906-3COM, ext. 241.

3Com® More connected.™

IS must calm public's Y2K fears

Wall Street holds successful Year 2000 demo as president calls for new law.

By Paul McNamara

Wall Street and President Clinton used separate forums last week to deliver the same message: The public requires reassurance that the Year 2000 problem will not cripple stock markets or corporations.

Toward that end, the president called for legislation to shield companies from lawsuits that might arise from the sharing of Year 2000 compliance data that later proves inaccurate. Meanwhile, on Wall Street, a consortium of securities firms and exchanges conducted the first in a series of tests designed to demonstrate the stock market's Year 2000 readiness.

Year 2000 experts said such high-profile measures will become increasingly important as the millennium nears and fears heighten.

"Public testing like this is a real confidence builder," said Tom Oleson, an analyst with International Data Corp. in Framingham, Mass. "Wall Street is particularly vulnerable [to fallout from Year 2000 failures], more so than almost any other industry."

Twenty-nine securities firms and 12 exchanges conducted mock trades based on the date Jan. 3, 2000, the new millennium's first business day. Although a full report on the results will not be issued until Aug. 10, organizers said the test transactions encountered no apparent Year 2000 glitches.

"This industry relies on the confidence of investors," said Margaret Draper, spokeswoman for the Securities Industry Association, which sponsored last week's test. "The goal is that John Q. Public will not notice anything happening on Jan. 3, 2000."

The threat of lawsuits has made reaching Year 2000 readiness more urgent for companies and organizations of all stripes, IDC's Oleson said, which is why he felt the president's call for legislation was particularly important.

"The industry needs protection against what I think is nothing more than ambulance chasing," he said.

Oleson recounted having recently asked the CEO of a major network vendor whether his company's lawyers were cautioning against the free exchange of compliance information.

"Yes, they are," the CEO responded, "because we are afraid that something that we might say will be shown not to be completely, totally accurate, and then the ambulance chasers will come after us."

Clinton attempted to address that concern in his speech last week before the National Academy of Sciences.

"Today, too many businesses are understandably reluctant to share information, fearing legal complication," Clinton said. "We have to take prudent steps to clear away any legal barriers to effective action."

The president called on Congress to protect companies from being sued over their efforts to publicize and share Year 2000 test data, presuming the efforts are made in good faith.

"The proposed Good Samaritan law will give companies the confidence they need to ensure that they keep their customers informed," Clinton said. "If ordinary citizens believe they're being told the full story, they'll be far less likely to act in ways that could hurt our economy."

There could conceivably be a downside to these handholding efforts, suggested one Year 2000 expert.

"They have a positive side in terms of moving us away from hysteria," said Andy Bachman, a Year 2000 specialist at Aberdeen Group in Boston. "On the other hand, this public wants to be told a happy story, so if the message decreases public awareness by [making people] pacified early on, that is potentially a bad thing." ■

Lotus pitches new bargain to cc:Mail crowd

By Paul McNamara
Cambridge, Mass.

Lotus Development Corp. last week dangled yet another carrot in front of its 14 million cc:Mail customers, whom the company has long feared losing to archrival Microsoft Corp.

Effective Aug. 3, cc:Mail shops under current $12-per-seat maintenance contracts will be offered free upgrades to the Lotus messaging client of their choice — be it a newer cc:Mail or Notes version — for no additional charge. Those not under maintenance would pay $19 per seat this year and $12 per seat in 1999. The deal also applies to users of IBM's OfficeVision, Lotus Mail and Notes Mail.

Lotus recently has been criticized by cc:Mail users who have called Lotus' ongoing efforts to retain their business insufficient. And with Microsoft taking dead aim at that same group of customers, there has been a renewed emphasis on the part of Lotus strategists to do more to make customers happy.

And there is reason to believe this latest gambit may find a more receptive audience.

Paul Evans, an industry analyst with first-hand cc:Mail experience called the upgrade deal "manna from heaven" for customers looking to upgrade, particularly those using versions that have Year 2000-compliance issues.

Until recently Evans, of San Francisco-based Ferris Research, Inc., had been an e-mail administrator for the Federal Aviation Administration, which has 42,000 cc:Mail seats. The option of upgrading for no additional client-related cost to software that can access the Domino Mail server will be particularly attractive to cc:Mail shops, Evans said.

A cc:Mail 6.3 client due in the third quarter will include that capability.

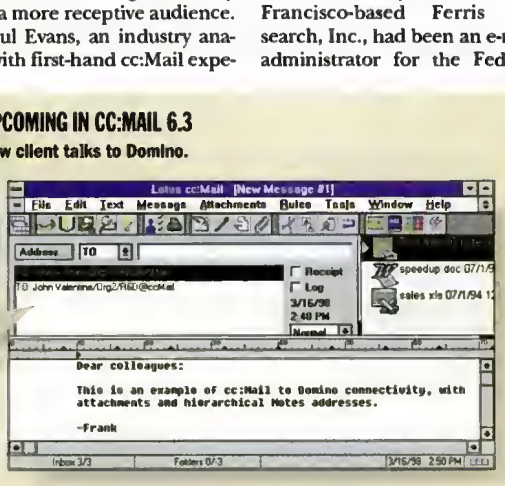
"What [the capability] does is allow you to start consolidating post offices, which means you save on administrative costs, which lowers your cost of ownership," he said.

Training burdens would also be greatly reduced, he added, because customers would not have to transition all of their users to an unfamiliar client in order to reach Year 2000-compliance and also access Domino Mail services such as calendaring, scheduling and discussion groups.

"When you've got 42,000 people, you don't necessarily want to bite the bullet and train them within a fixed period," Evans said. ■

UPCOMING IN CC:MAIL 6.3

New client talks to Domino.



Connectivity to Domino allows hierarchical notes addressing.

NetworkWorld

Editor in Chief: *John Gallant*
Editor: *John Dix*

NEWS
News Editor: *Doug Barney*
News Director: *Bob Brown*
Associate News Editor: *Michael Cooney*
Phone: (508) 875-6400

NETWORK WORLD FUSION
Online Editor: *Adam Gaffin, Phone: (508) 820-7433*
Online Reporter: *Sandra Gittlen, Phone: (508) 820-7431,* **Online Researcher:** *Jason Rahim, Phone: (508) 820-7532*

LOCAL NETWORKS
Senior Editor: *Christine Burns Phone: (508) 820-7456,*
Senior Editor: *John Cox, Phone: (978) 834-0554, Fax: (978) 834-0558;*
Senior Editor: *Robin Schroer Hohman, Phone: (203) 459-9948*

INTERNETWORKS
Senior Editor: *Jim Duffy, Phone: (508) 820-7525*
Senior Editor: *Tim Greene, Phone: (508) 820-7422*
Staff Writer: *Marc Songini, Phone: (508) 820-7484*

CARRIERS & ISPS
Senior Editor: *David Rohde Phone: (202) 879-6758, Fax: (202) 347-2365*
Senior Editor: *Denise Pappalardo Phone: (202) 879-6745; Fax: (202) 347-2365*

INTRANET APPLICATIONS
Senior Editor: *Ellen Messmer, Phone: (202) 879-6752, Fax: (202) 347-2365;*
Senior Editor: *Paul McNamara, Phone: (508) 820-7471,* **Senior Editor:** *Chris Nerney, Phone: (508) 820-7451,* **Senior Editor:** *Andy Eddy, Phone. (650) 574-9222, Fax: (650) 574-9223*

COPY DESK/LAYOUT
Copy Chief: *Charley Spektor*
Senior Copy Editor: *Melissa Adams*
Copy Editors: *Lisa Kaplan Adase, John Dooley, Denise Dubie, Melissa Reyes*

ART
Design Director: *Rob Stave*
Associate Art Director: *Tom Norton*
Deputy Art Director – IntraNet: *Allyson Nicholaeff*
Assistant Art Director: *Paul M. Lee*
Graphic Designer: *Lisa Hoosepian*
Online Designer: *John Fischer*

FEATURES
Features Editor: *Paul Desmond, Phone: (508) 820-7419, Fax: (508) 820-1103*
Managing Editor, Features: *Amy Schurr, Phone: (508) 820-7485, Fax. (508) 820-1103*
Features Reporter: *Neal Weinberg, Phone: (508) 820-7449, Fax: (508) 820-1103*
Associate Features Editor: *Susan Collins, Phone: (508) 820-7413, Fax: (508) 820-1103*
Associate Features Editor: *Suzanne Gaspar, Phone: (508) 820-7489, Fax: (508) 820-1103*

REVIEWS
Test Center Director: *Lee Schlesinger Phone: (508) 820-7416*
Reviews Editor: *Ann Sullivan Phone: (508) 820-7408*
Test Alliance Partners: *James Gaskin, Gaskin Computer Services, Mark Gibbs, Gibbs & Co., Joel Snyder, Opus One, Dennis Williams, ProductReviews.com*
Contributing Editors: *Daniel Briere, Mark Gibbs, James Kobielus, Mark Miller, Alan Power*
Buyers Guide Contributors: *Tony Cross, Linda Musthaler, Current & Co., Mark Miller, DigiNet Corp., James Kobielus, LCC, Inc.; Daniel Briere, Melanie Rangum, Christine Heckart, Lisa Henderson, Beth Gage, TeleChoice, Inc.*
Telecoms: *Phil Frank, Joe Trino*

INTRANET
Executive Editor: *Beth Schultz, Phone: (773) 283-0213, Fax: (773) 283-0214*
Senior Editor: *Peggy Watt, Phone: (650) 903-9519, Fax (650) 968-3459*
Art Director: *Tom Norton*
Deputy Art Director: *Allyson Nicholaeff*

Editorial Operations Manager: *Cheryl Crivello*
Office Manager, Editorial: *Glenna Fasold*
Editorial Assistant: *Pat Jasefek*

DO YOU HAVE A POWER NETWORK

If dealing with Year 2000 PBX issues has

you frustrated, we suggest you invest in a Meridian 1.

Or perhaps a heavily padded helmet.

INVEST NOW IN A NORTEL MERIDIAN 1. And save yourself further head trauma induced by complex compliance issues. Meridian 1 – the global leader in digital switching – has been Year 2000 compliant since 1976. In addition, Meridian's product portfolio – the industry's broadest – seamlessly integrates voice, video and data. And Meridian 1 helps transform your network into a Power Network, so it adapts to changing demands with the least disruption for you and your customers. Which means with Meridian 1, you get a digital switch designed to take your business well into the new millennium. And the commitment of a company anticipating challenges and solving problems now, so you won't have them to deal with later. For more information and a definition of Year 2000 compliance, visit **www.nortel.com/169E** or call **1-800-4 NORTEL, dept. 169E**. Or for the helmet, check with a sporting goods store near you.

NORTEL
NORTHERN TELECOM

MERIDIAN

3Com gets ex-DEC exec

By Jim Duffy
Santa Clara, Calif.

3Com Corp. last week gave former Digital Equipment Corp. executive Bruce Claflin the newly created position of president and chief operating officer.

Claflin, who assumes the post on Aug. 10, will oversee 3Com's $5.4 billion worldwide networking operations. He will handle the sales and marketing of the company's Large Enterprise, Small-to-Medium-Enterprise, Carrier Systems and Client Access business units.

3Com had kept its executive management team at the same size since its merger with U.S. Robotics Corp. in June 1997.

Bruce Claflin *pushes convergence.*

The merger doubled the number of employees and increased revenue by 78%, the company said.

But 3Com restructured and needed an extra executive to coordinate initiatives that cross divisional lines and to focus on internal and external relations, 3Com Chairman and CEO Eric Benhamou said in a prepared statement.

As chairman and CEO, Benhamou will handle the company's strategic, financial and technology directions; public policy; partnerships; and customer relationships.

Benhamou will also manage finance, long-range technology direction and business development, which includes new business investments and initiatives, strategic partnerships and Palm Computing, a subsidiary of 3Com.

Benhamou said Claflin's appointment was not a move to groom his successor. Benhamou added that he has no immediate plans to step down as 3Com CEO. "We're one of the very few Fortune 300 companies that did not have [Claflin's position] formerly in place, and now we do," Benhamou said.

Converging on convergence

The industry trend toward establishing IP as the next dial tone helped attract Claflin to 3Com. Claflin said he will help Benhamou manage 3Com's partnership with telecom giant Siemens AG and forge other alliances.

"Those companies that have the resources, the skill and the will to capitalize [on convergence] I think can have enormous changes in their market position," Claflin said. "3Com, to me, is one of those companies."

Claflin most recently served as senior vice president, Worldwide Sales and Marketing at Digital, where he led a global organization with $13 billion in revenue and 12,000 employees. Following Compaq Computer Corp.'s acquisition of Digital, Claflin reportedly turned down an executive management post at the PC giant because he did not want to relocate to Houston. Yet Claflin will relocate to Santa Clara. ■

Appliances

Continued from page 1

devices that give individuals some kind of access to the Internet, according to Steve Kaldor, vice president of consumer device research at International Data Corp. (IDC), a Framingham, Mass., market research company.

Information appliances can be television set-top boxes that blend Internet access with TV, Webphones that can display e-mail or browse the Internet, and, as long as they are connected to the Internet, an array of smart handheld computing devices.

Huge growth ahead

IDC estimates that appliance unit shipments in the U.S. will jump from 3.6 million this year to 26.4 million in 2001, compared with PC shipments of 36.3 million this year and 51.1 million in 2001. The figures mean that appliances will grow at a compounded annual growth rate of 96% vs. 12% for PCs.

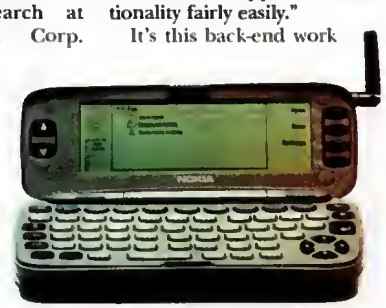
While the appliances are small, the market is big on hype, forcing MIS to sift through all the glitz to figure out how the devices can actually help. A growing number of companies are concluding, based on small pilot projects, that while most of the basic technology is available, many challenges remain.

Take, for example, Peter Beaman, chief research officer with Eclipsys Corp., a Del Ray Beach, Fla., vendor of clinical information systems. Last fall Beaman jury-rigged a demonstration in which a doctor received, via the Nokia 9000, a simulated automatic alert about a change in a patient's potassium levels. Using the 9000, the doctor was able to access more detailed information through a Web site and then order treatment changes.

"With relatively simple means, we could talk to the network backbone, deliver clinical alerts and let the doctors see lab results and medication history," Beaman said. "The demonstration left little doubt in our minds that this technology is practical."

But Eclipsys still hasn't deployed this capability. The reason: The company needs to complete the rest of its new clinical system, a big chunk of which is being written in Java. "The hard part is the clinical support database," Beaman said. "Once we've done that, we can add this [appliance] functionality fairly easily."

It's this back-end work that constitutes one of the main challenges facing MIS groups trying to exploit the potential of information appliances. Mark Bregman, general manager of IBM's Pervasive Computing group, gives a typical example: A brokerage house customer receives a pager or Webphone alert that one of his stocks has reached a threshold price. Using the appliance, he could then buy or sell the stock at once. But to make this possible, vendors and MIS groups will have to solve security problems, ensure reliable connections, tailor the application display, and even redesign the user interface for a given appliance, Bregman said. Synchronizing data among client appliances, PCs and corporate databases will also take a lot of work, according to several experts.



Nokia's *sleek Communicator combines a cellular phone with Web and e-mail access.*

Phillips' *answer to the Palm Pilot.*

MIS groups will have to face these software development issues, said Marc Abrams, associate professor of computer science at Virginia Tech in Blacksburg. "Because this is not general-purpose software, corporations will have to custom-build it," he said.

There is also a protocol problem. The Internet provides many protocols, such as HTTP and HTML, which form a critical standard foundation for the corporate use of appliances, according to Don Norman, senior technical advisor and all-around appliance guru at Hewlett-Packard Co.'s HP Laboratories in Palo Alto, Calif. But, he said, there is now no standard for "handshaking" protocols, which let appliances automatically negotiate the best way to communicate with each other and with other computers over the 'Net. HP is testing its JetSend protocol at customer sites now for this purpose.

Problems abound

"The technical problem is trivial," Norman claimed. "The hard part is getting everyone to agree on the same protocol."

Finally, there are problems with the devices themselves, problems attributed to poor design, immature technologies, and a focus on high-end, and hence expensive, products. The Nokia 9000, for instance, costs between $800 and $1,200.

On the technical side, Webphones have limited displays, their speed is slow, and their miniature keyboards are awkward to use. And systems that use handwriting recognition software, such as the Nino from Phillips Mobile Computing Group, still require users to make adjustments in their writing style.

If these challenges can be met, some observers claim to see a bright future for appliances.

"Information access is simply not convenient today," said Greg Wolff, group manager for product marketing with Sun Microsystems, Inc.'s embedded and consumer products group.

"Right now, it's all through the desktop PC. Our view is that this is a bottleneck. These other devices, the appliances, will make information more accessible. And then people will go to the networks more often for more things."

Eclipsys' Beaman agreed. "My personal view is that PCs won't go away," he said. "But I think we'll be surrounded by devices that will provide access to network-based services. Some will be PCs, and some won't." ■

Get more information online at www.nwfusion.com DocFinder: 8048

Nortel puts intranet telephony onto the PBX

By David Rohde
Washington, D.C.

Continuing its IP catch-up game, Nortel announced that by year-end it will offer IP telephony support on its PBXs.

Nortel last week unveiled the Meridian Integrated IP Telephony Gateway, an eight-port trunk card for its flagship Meridian 1 PBX. The card, loaded into a Meridian peripheral module that supports line and trunk cards, provides a 10Base-T network interface to a corporate intranet.

Once the card is installed, corporate network administrators can route some of their voice traffic over their intranets, just as they now route voice traffic via a PBX to dedicated or switched-access trunks. Those trunks in turn reach their long-distance and local carriers.

With the Meridian Integrated IP Telephony Gateway loaded on the PBX, end users will not have to dial any extra digits, as they typically must when using an IP carrier's service. "It looks to the Meridian 1 like any other trunk card," said Ann Swenson, product marketing manager for the new offering.

A key feature of the new product is that the PBX will test for dropped packets or excessive network latency. The exact latency levels can be set by network administrators, but Swenson suggested a maximum delay threshold of 150 msec one-way. If delay exceeds that level, the call falls back to the public telephone network. Swenson discouraged using the gateway to send traffic over the Internet.

Although numerous IP telephony gateways and LAN-based PBX replacement products have hit the market, users and analysts said IP trunking options for existing PBXs are needed to promote IP telephony in large enterprises.

Scott Clayton, manager of global network engineering for semiconductor maker LSI Logic Corp., said he is planning to test new LAN-based voice servers, but his first choice for implementing IP telephony would be to test Nortel's integrated PBX gateway on his company's Meridian switches.

"I believe very strongly in convergence, but new communications services are going to have to interoperate with our legacy systems," Clayton said. "This brings open systems value to the legacy PBX."

Nortel's IP initiative comes six months after its principal PBX rival, Lucent Technologies, Inc., unveiled an IP trunking option on its Definity PBX line. Lucent's product is due this fall. ■

Get that IP in the PBX

Facts about the Meridian Integrated IP Telephony Gateway:

Voice compression standards supported:
- G.711 uncompressed 64K bit/sec voice
- G.723 compressed voice down to 5.3K bit/sec
- G.729 compressed voice down to 8K bit/sec

Target price:
- $7,500 per eight-port card

General availability:
- January 1999

SOURCE: NORTEL, RICHARDSON, TEXAS

Y2K is a complete pain.

It's also an opportunity to improve your network.

*For more information about Windows NT Server and Year 2000 see www.microsoft.com/ntserver/y2k.

†Price reduction applies to version upgrades from any previous version of Windows NT Server and competitive upgrades—consult your reseller for a complete list of qualifying competitive products. Discount is up to 20% off estimated retail price of Windows NT Server 4.0. Reseller prices may vary. Promotion does not apply to Windows NT Server 4.0 Academic product. All price reductions effective through 11/15/98. Offer good in U.S. and Canada only.

Upgrade to Microsoft Windows NT Server 4.0 today.

Get one step closer to the next millennium.

Get a great file/print server.

Get an outstanding application server.

Get them unified on one platform.

Get up to 20% off and a free Services for NetWare CD-ROM.

Ironic, isn't it? That an inconvenience of Y2K's* immensity might actually do your network some good after all. But consider it this way: since there's no getting away from that major network upgrade, maybe there's something you can get out of it. For instance, here's what happens when you upgrade to Microsoft® Windows NT® Server 4.0:

Windows NT Server 4.0 delivers proven file/print performance. Using the industry-standard Netbench performance tool, Windows NT Server 4.0 outperforms Novell NetWare 4.11 by nearly 17% in file/print throughput tests.

Windows NT Server 4.0 unifies file/print and applications on one platform. It's the ideal choice for supporting key business applications, including groupware like Microsoft Exchange Server. There are already over 4,000 applications for Windows NT Server available today. And, of course, running your applications and file/print on a common platform simplifies the management of your network—giving you more time to focus on achieving your long-term goals.

Windows NT Server 4.0 is the easy way to prepare for the future. It's already the leading intranet platform—in fact, according to IntelliQuest, it's the platform that 56% of corporate Web applications are being built on. And with features like remote access services, virtual private networking and out-of-the-box integration with Microsoft Proxy Server, you can enable cost-effective, secure communication across the Internet among employees, customers and partners. It provides exceptional Web services too—according to NetCraft, more than half a million Internet sites are currently running on Windows NT Server.

Windows NT Server 4.0 reduces total cost of ownership. A recent study by the Business Research Group compared it to NetWare in a mixed environment, and revealed that, as a unified platform, Windows NT Server 4.0 lowers the costs of providing file/print sharing and application support by nearly 20%.

And if you upgrade now you'll save up to 20% off the estimated retail price! You'll also qualify for a free Services for NetWare CD-ROM (ERP $149) that makes it easier for you to transition your NetWare-based network to Windows NT Server 4.0.

So the question is not: How can I minimize the inconvenience of having to upgrade my file/print? The question is: How can I maximize the benefit of doing so? It seems that Y2K is about more than just surviving the turn of the millennium. Windows NT Server proves that it's equally about making the most of what's left of the 1900s, and getting the 2000s off to a flying start.

Upgrade to Windows NT Server 4.0 and save up to 20%.!

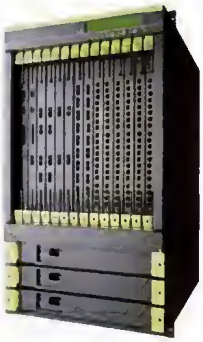
Act now to get a FREE Services for NetWare CD-ROM.

Get details at: www.microsoft.com/ntserver/upgrade/

Where do you want to go today?® Microsoft®

"It's Like Buying Light Bulbs From Thomas Edison"

— Robert J. Jones
Director, Information Technology
Weider Publications



PowerRail™ 5200
Enterprise Routing Switch
More than 37 million pps routing throughput; Up to 25 Gigabit Ethernet ar 240 Fast Ethernet ports

No one understands gigabit networking solutions better than Bernard Daines. For the past 20 years, Bernard and his troops have put performance and reliability into your networks. Now, Bernard and the Packet Engines team continue in this tradition – delivering their industry-leading PowerRail family of routing switches. PowerRail routing switches are optimized for enterprise networks. They provide significantly greater performance than any other routing switch. And they're built with Enginuity™ to provide Infinite Routing™, mission-critical reliability, application-aware networking, and continuous investment protection.

Once again, Bernard delivers the solution to meet tomorrow's networking challenges, today. Bright idea.

PACKET ENGINES
Gigabit Performance. Enterprise Reliability.™

Box 14497 Spokane WA 99214-0497
CORP: (509) 777-7000 FAX: (509) 777-7001
info@packetengines.com
http://www.packetengines.com

Bernard Daines
Founder of Packet Engines
Father of Fast Ethernet

If you would like to talk about performance & reliability, give me a call:
509-777-7123

Briefs

■ **Sun Microsystems, Inc.** *last week rolled out a new* **workgroup/branch office server,** *the Enterprise 250, which runs Solaris. The box can sport up to two 300-MHz, 64-bit Sun UltraSPARC processors with up to 2M bytes of cache each, as well as up to 2G bytes of RAM. The server comes bundled with Solaris for Intranets software, which includes e-mail, security and network management. The Enterprise 250 is available now and costs $9,995.*

Sun's *Enterprise 250 server*

✆ *Sun: (800) 786-3463*

■ **Plaintree Systems** *is shipping* **FDDI and Router Accelerator Gigamodules** *for its WaveSwitch 9000 series gigabit switches. The Router Accelerator Gigamodule is a Layer 3 switch that can be used to off-load IP traffic from LAN backbone routers. Up to four modules can be configured in a WaveSwitch 9200, providing a combined forwarding capacity of six million packet/sec. The FDDI Gigamodule lists for $18,995 or $2,374 per port. The Router Accelerator Gigamodule is priced at $14,995. Both are shipping now.*

✆ *Plaintree: (800) 370-2724*

■ **Novell, Inc.** *this week will begin shipping* **BorderManager Authentication Service,** *which the company claims will tighten security and ease the administration of remote access users when deployed in conjunction with Novell Directory Services (NDS). Based on the Remote Authentication Dial-In User Service (RADIUS) protocol, the new Novell service runs on NetWare 4.X and Windows NT. BorderManager Authentication Service replaces RADIUS for NDS technology that Novell had been providing free since June 1997. The new service costs $995 for a five-user license.*

✆ *Novell: (801) 429-7000*

Cabletron uncorks 10/100 SmartSTACK switches

Fruits of the NetVantage purchase to give Bay, Cisco and 3Com a run for their autosensing money.

By Jim Duffy
Rochester, N.H.

Cabletron Systems, Inc. this week will announce the availability of two desktop and workgroup switches that are the first in a series of products resulting from the company's acquisition of NetVantage, Inc.

At the end of this month, Cabletron will ship two 10/100M bit/sec SmartSTACK Fast Ethernet workgroup switches priced at $125 per port. The products run at wire speed using customized Application Specific Integrated Circuit (ASIC) technology and feature standards-based policy management of virtual LANs and traffic priority.

The SmartSTACK ELS100-24TX is a stand-alone Fast Ethernet switch with 24 RJ45 ports. The box costs $2,995.

The SmartSTACK ELS100-24TXM is a stand-alone Fast Ethernet switch with 24 RJ45 ports and one modular uplink slot. It costs $3,395.

Cabletron will also roll out uplink modules for the two new switches. The EPIM100-2F2 is a two-port multimode fiber uplink module that costs $1,280.

The EPIM100-2F3 is a two-port single-mode fiber uplink module that costs $5,130. The EPIM100-2F4, priced at $3,200, is a two-port uplink module with one multimode fiber port and one single-mode port.

For policy-based virtual LAN configuration and priority, the SmartSTACK switches support the IEEE 802.1p and 802.1q standards. Each switch can support up to 4,096 VLANs and features two priority queues, Cabletron said.

The switches also support 802.3X for flow control and threshold-based throttling for broadcast control.

Each switch has a 4.2G bit/sec backplane and can switch frames at wire speed on all ports in half- or full-duplex mode, Cabletron said. The switches forward 3.6 million packet/sec, the company said.

Cabletron's *SmartSTACK ELS100-24TX switch is based on NetVantage technology.*

The SmartSTACK switches support 12,288 media access control addresses and buffers that are 512K-bytes deep per port.

In the 10/100 autosensing switch arena, Cabletron's SmartSTACK offerings will go up against Bay Networks, Inc.'s BayStack 350, Cisco Systems, Inc.'s Catalyst 2900 line and 3Com Corp.'s SuperStack II 3300. The Bay and 3Com switches cost $149 per port, while the Cisco box costs $125 per port.

Despite the name, the SmartSTACK switches are not stackable. Cabletron is working on a stacking mechanism for the switches but has not determined a time frame for unveiling stackable 10/100 devices, said Martin Lowry, SmartSTACK program manager at Cabletron. "It's not rocket science to implement [stackability]," he said.

Next month, Cabletron will unveil dual Gigabit Ethernet uplinks for the SmartSTACK switches that feature GBIC interchangeable media interfaces, Lowry said.

Cabletron will also boost SmartSTACK switch capacity to 6.5G bit/sec and ship the new switches and uplinks in September, he said. In 60 to 90 days, Cabletron will add the capability to logically group several Fast Ethernet and Gigabit

See **Cabletron,** *page 22*

Get more online:

- **Details from Cabletron**
- **Overview of the SmartSTACK product line**
- **Background on the NetVantage acquisition**

www.nwfusion.com

HP pops 10/100 switches at $99 per port

By Jim Duffy

Hewlett-Packard Co. last week unveiled two 10/100M bit/sec autosensing Ethernet switches at $99 per port, which may be the lowest per-port price from a leading 10/100 switch vendor.

HP's ProCurve Switch 4000M and 2400M are desktop and workgroup switches that feature IP Multicasting via Internet Group Multicast Protocol snooping as well as IEEE 802.1p and 802.1q virtual LAN tagging and port trunking.

The switches come with HP TopTools for Hubs & Switches software, which is a new package for network management, monitoring and performance analysis.

The switches can also be managed from the World Wide Web, enabling network administrators to view the whole network from any location.

The HP ProCurve Switch 4000M features a modular chassis and gigabit uplinks. It sports 40 autosensing 10/100Base-T ports and includes five expansion slots for the addition of 10/100Base-T, 10M or 100M bit/sec fiber or gigabit modules.

The modules include the following:

- Eight-port 10/100Base-TX
- Four-port 100Base-FX
- One-port 1000Base-SX Gigabit Ethernet
- Four-port 10Base-FL

The 4000M can support up to 80 autosensing 10/100M bit/sec switch ports and up to five gigabit ports. The box is rack-mountable and features an optional redundant power supply.

The HP ProCurve Switch 2400M features 24 autosensing 10/100Base-T ports with a 2.4G bit/sec switch bus. The switch is also rack-mountable.

The new HP ProCurve switches are expected to be available Aug. 1.

HP is the latest in a bevy of companies, including Bay Networks, Inc. and Cabletron Systems, Inc., to roll out new 10/100 switches at aggressive prices (*NW,* July 13, page 8).

The new TopTools software, meanwhile, provides end-to-end enterprisewide management of HP hubs and switches when used in conjunction with HP's OpenView enterprise management platform.

HP TopTools for Hubs & Switches replaces HP's Advance-Stack Assistant software. In addition to Web-based enterprise management of hubs and switches, the software:

- Runs on CA-Unicenter, Tivoli TME 10 and IBM NetView management platforms;
- Monitors traffic on up to 1,500 segments simultaneously;
- Analyzes stored traffic data and suggests ways to improve the performance of any Ethernet speed, from 10M bit/sec to 100M bit/sec to gigabit.

TopTools for Hubs & Switches is available now.

✆ HP: (800) 533-1333

HP THROWS A COUPLE OF PROCURVES

New product	U.S. Price	Price/port
HP ProCurve Switch 4000M (40 ports)	$3,959	$99
HP ProCurve Switch 2400M (24 ports)	$2,379	$99

Go For IT.

Asset And
Inventory Management

Total Network
Security

Complete Directory
Management

Secure Data
Communication

Unicentered

IT is a new generation of management software that's unlike anything you've ever seen before.

IT is a family of best-of-breed solutions that can tackle all of your network and systems management challenges.

IT's smart. *IT*'s new. *IT*'s different.

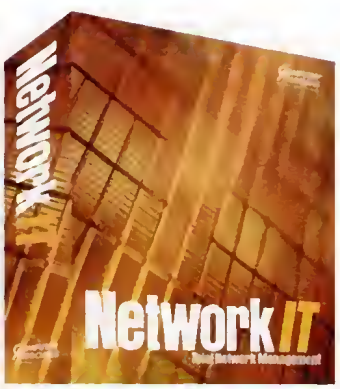
Call for information and you'll be glad you did.

Because this really is, as good as *IT* gets.

Call 1-888-864-2368 or visit www.cai.com

COMPUTER ASSOCIATES®
Software superior by design.

Maximum Network Bandwidth



Total Network Management

Total Enterprise Security

Automated Software Delivery

RAScom adds VPN to NT access repertoire

Company pushes Windows NT-based RAServer gear to implement secure remote access.

By John Cox
Salem, N.H.

When it comes to remote access, RAScom, Inc. believes that Windows NT is the way to go.

The remote access gear maker has just introduced two new products with a virtual private network (VPN) flair, the RAServer 2100 and 2600. Both use NT as a base operating system, instead of proprietary software such as that found in rival products from Cisco, Inc. and Ascend Communications, Inc. With NT the remote access server can exploit built-in features such as Microsoft Point-to-Point Compression to improve network performance, according to RAScom executives.

A splash of VPN

Remote users can dial in to the RAServers over analog or digital telephone links or take advantage of the RAServers' new VPN support. With VPN support, users can dial in to an ISP using a local telephone number, then select a button from the screen to create a secure tunnel through the IP network to the remote RAServer, RAScom executives said.

The use of NT and the range of features was attractive to Dan Sherbondy, president of Tiger-link, a small, newly minted ISP in Brea, Calif.

"Their price per port is about the same as some of the other vendors, but they add a lot of features that make it very attractive," he said. "It came ready to go, and it ran from the start. I haven't had to do anything with it."

The RAServer 2100, which is designed as an entry-level product, is priced at $200 per port, with 16 to 60 ports.

The RAServer 2600 is a mid-range system, priced at $275 per port, with 16 to 120 ports. It has a redundant power supply and is built to handle an optional, second, removable disk drive, so customers can configure a RAID storage system to ensure high availability if the first drive crashes.

Tweaking RASware

RAScom also released Version 3.0 of its RASware software, which is the software that links NT and Microsoft's Routing and Remote Access Server software with various WAN protocols and drivers.

This new version adds support for Microsoft's Plug and Play specification to simplify the adding of new hardware components.

It also supports symmetric multiprocessing computers and is compatible with the V.90 56K bit/sec modem standard and the Multi-Link Point-to-Point Protocol.

✆ RAScom: (603) 898-5200

NEW RASERVER TAPS NT FOR REMOTE ACCESS

Like previous RAScom models, the RAServer 2100 is based on NT. This new model also supports VPN connections and the V.90 56K bit/sec modem standard.

SOURCE: RASCOM INC., SALEM, N.H.

Server king sees red after Digital buy

By Kristi Essick

Due to hefty charges related to its recently completed acquisition of Digital Equipment Corp., Compaq Computer Corp. last week announced a net loss of $3.6 billion, or $2.33 a share, for the second quarter of 1998.

Not including one-time charges of approximately $3.6 billion taken in connection with the Digital merger, Compaq's earnings for the second quarter were $32 million, or two cents per share.

This marks a big dive compared with net income of $257 million, or 17 cents per share, in the second quarter of 1997, but it beats analyst estimates slightly.

During the three months ended June 30, Compaq achieved revenue of $5.8 billion, a 5.7% increase compared with $5.5 billion during the same quarter last year, the company said in a statement.

Product sales — which make up the bulk of Compaq's revenue stream — dropped during the second quarter of 1998, but revenue from Compaq's services division soared from $110 million in the second quarter of 1997 to $460 million in the same period this year.

Product sales fell to $5.37 billion in the second quarter of 1998, down slightly from $5.41 billion in 1997.

During the remainder of the year, Compaq plans to work on tightly integrating its new Digital arm, said Compaq CEO Eckhard Pfeiffer.

However, the third quarter will be transitional, with a return to profitability for the newly joined Compaq-Digital in the fourth quarter, he said.

Essick is a correspondent with IDG News Services' London bureau.

Cabletron

Continued from page 19

Ethernet links into a high-speed trunk, Lowry said. And at the end of this year or early next year, Cabletron will unveil an eight-port Gigabit Ethernet SmartSTACK switch for collapsed backbone and workgroup aggregation applications at $850 per port, he said.

Lastly, Cabletron will leverage the SmartSTACK Cyclone ASICs to extend the life of the switches it obtained from the acquisition of Digital Equipment Corp.'s Network Product Business.

✆ Cabletron: (603) 332-9400

WIRED WINDOWS

Psst . . . just one word

In the 1967 movie, "The Graduate," Mr. McGuire (played by Walter Brooke) takes Benjamin Braddock (played by Dustin Hoffman) aside and has the following conversation:

McGuire: I just want to say one word to you . . . just one word.

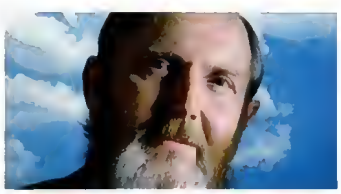
Braddock: Yes, sir.

McGuire: Are you listening?

Braddock: Yes, sir, I am.

McGuire: . . . Plastics.

Today, I want to take all of the network managers aside and say one word to them — are you listening? — biometrics. Fingerprint, retina, voice and face — these are the network access tools of the not-so-distant future. While these are hardly new technologies, up until now each vendor has gone its own way. Authentication software has to be written for each operating system and hardware platform.



Dave Kearns

But back in April, Compaq, IBM, Identicator Technology, Microsoft, Miros and Novell formed a consortium to help develop standards for biometric identification and authentication of PC users. The BioAPI Consortium plans to provide standardized Application Programming Interfaces (API) that can be incorporated into operating systems and application software.

Although work on Biometrics has been going on for 10 years, none of the major operating system or PC vendors had come out with a product simply because there was no standardization. But recently we've seen Novell award a prize for best Novell Directory Services application to Mission Data Systems for that company's SentriNET user authentication system, which uses fingerprint recognition. And just a couple of weeks ago, Compaq announced a fingerprint reader, Compaq Fingerprint Identification Technology, which will sell for less than $100.

Fingerprint reading is just the start, however. In talking to Hal Jennings of Biometric Access Corp. (www.biometricaccess.com) and Joe Burke at Miros (www.miros.com), both emphasized that facial recognition was the future for biometric access and authentication.

And then there's voice. A number of companies (including IBM) are shipping voice recognition software. It's not too hard to imagine that, sometime soon, we'll see background authentication of voice for each command spoken to the computer. Even Star Trek didn't have that.

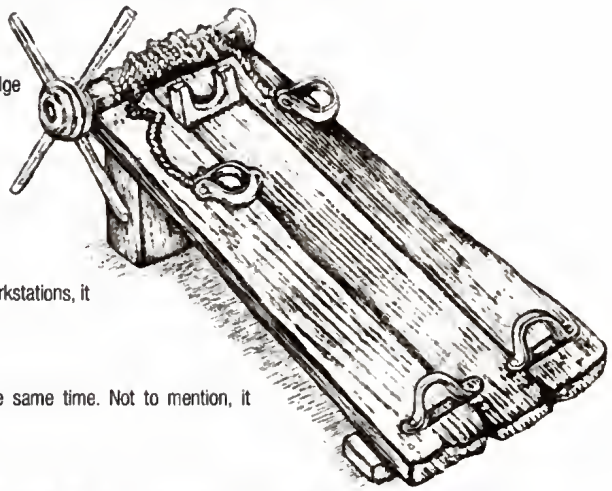
Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

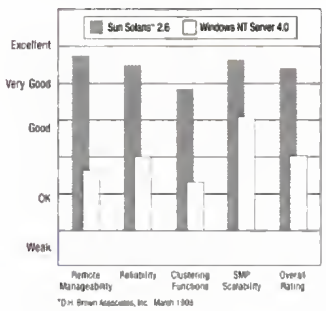
Tip of the week

RiverFront Software's WebDrive is a Windows 95 file system driver that allows you to map a network drive to an FTP site. No FTP-specific user interface is required to transfer files to or from an FTP server. WebDrive FTP-enables any application, allowing it to read and write files directly to the FTP server just as it would to a local disk drive. WebDrive is priced at $39.95 and a free trial version can be downloaded from the RiverFront Web site at www.riverfrontsoftware.com.

RUNNING ENTERPRISE APPLICATIONS ON AN NT SERVER?

Whatever you choose to do in the privacy of your own office is your business. But if you rely on a Microsoft Windows NT Server to run your company's key business applications, the result could be torturous. In fact, according to D.H. Brown, servers running on Windows NT "continue to fall short of being able to support enterprise requirements.*" So why not indulge in something a bit less agonizing? The Sun™ Enterprise™ 450 Workgroup Server, starting below $15,000, not only delivers print and file services for your PCs and workstations, it runs multiple enterprise applications at the same time. Not to mention, it whipped NT in datawarehousing, Lotus Domino, Web and SAP performance. And because the Sun Enterprise 450 is part of a family that scales up to 64 processors, you'll never have to sacrifice business-critical scalability. Plus, Sun supports their entire line of servers with worldwide customer service. So call 800-SUN-FIND or visit sun.com/wgs/nwd to avoid a potentially painful situation. Unless, of course, you're into that sort of thing. THE NETWORK IS THE COMPUTER.™





*D.H. Brown Associates, Inc. March 1998

Sun microsystems

WHAT IS IT YOU PEOPLE DO FOR FUN?

SPECIAL FOCUS

Network operating systems

Don't mess with their NetWare

By Paul McNamara

They see NetWare servers the same way NRA members see guns: Don't even think about trying to take 'em away.

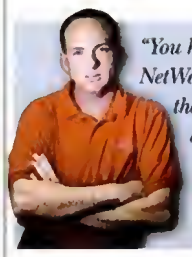
Even though a remarkable number of NetWare customers are making the switch to Microsoft Corp.'s Windows NT (see graphic), many Novell loyalists continue to swear by and expand their NetWare networks. These NetWare loyalists require no prodding to get them to defend their choice.

Phil Easter, technology strategist at Greyhound Lines, Inc. in Dallas has "personally been involved with NetWare for 10 years." Greyhound deploys 20 NetWare 4.11 servers covering 1,500 administrative workers. The company has no intention of jumping on the NT bandwagon.

"I've been there when [NetWare] was hot, when it wasn't so hot and now that it's starting to get a little hotter," Easter says. "Over the years, it's just proven to me to be a solid, reliable platform — very scalable, robust and clean."

According to Bob Pembroke, corporate network manager for Cabot Creamery in Cabot, Vt., reliability and ease of administration continue to be NetWare hallmarks competitors simply cannot match. Pembroke oversees a half dozen NetWare 4.11 servers.

"I have a lot of friends around who have NT, and they say it's a nightmare," Pembroke says. "My NetWare servers run until I take them down to refresh them or do something else. Knock on wood, they never go down."



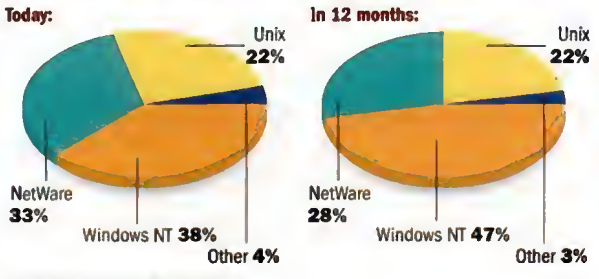
"You hear about people ripping out NetWare and throwing in NT and then finding out that the management nightmares — the soft dollars — are killing them."

Phil Easter, technology strategist, Greyhound Lines

PAUL BUCK

NETWARE LOSING GROUND TO NT

A survey of 500 leading U.S. network users showed the following deployments of network operating systems.



SOURCE: NETWORK WORLD 500/PROGRESSIVE STRATEGIES

Easter says the common management scheme provided by NetWare through Novell Directory Services (NDS) results in cost savings that often are overlooked by users migrating to other operating systems.

"In a shop like mine, if I didn't have that [directory], I'd have to have a Unix admin, an NT admin, a Novell admin and mainframe admin," he says. "With NDS, I can start leveraging all of those disciplines across a common layer of NDS, and it hooks into all of these systems."

All of the users interviewed for this story expressed great interest in the upcoming release of NetWare 5.0, an upgrade that will likely prove crucial to Novell as it attempts to staunch the bleeding from its installed base.

"NetWare 5.0 pushes things into a new area for us in that they add native IP," Easter says. "We are 100% IP [with] a lot of locations coming over typically 56K lines. Being able to provide true NetWare services over that wire is going to be a real advantage to us."

Native IP in NetWare also appeals to administrators at the U.S. Navy's Spawar Corporate Information Systems Office in San Diego. "We've been beta-testing [NetWare 5.0], and it's pretty neat," says Peter Cruikshank, a systems engineer at Spawar. "We want to move to a strictly IP environment."

Spawar currently employs 100 NetWare servers and 20 NT servers, a ratio Cruikshank does not see changing any time soon.

"A lot of people come out and try to sell their product as being everything," Cruikshank says. "Novell sells its product as being able to fill a requirement within your operation. In a large enterprise organization, there is never going to be one single product that is going to do it." NetWare, however, will remain a mainstay in his shop, he says.

"If somebody came out with [an alternative] today that did everything I wanted it to do better and in a more efficient manner, I would jump," he adds. "Right now, at least in the next 12 to 18 months, Novell seems to be on the right track."

A recent *Network World* survey, however, found that 42% of 500 U.S.-based network users intend to replace NetWare servers with NT sometime in the next year.

According to Gary Later, IT manager at Salt Lake City-based LiteTouch, Inc., those making the switch may also be making a mistake.

"Microsoft has successfully created the impression that NT is the hot [network operating system] for all networking applications," he says. "The only area where that is true is in application service. Microsoft marketing has leveraged this one area, making many think that one NOS for everything is better than two."

Even NT's reputation for being easy to manage has a trade-off, in Later's opinion. "One of the reasons NT appears to be so easy is that it is limited in a lot of the things it can do," he says. "It's a very powerful thing for running a client/server application, but not for managing an entire operation."

Don Clark, manager of client/server networking at Foundation Health Systems, Inc. in Rancho Cordova, Calif., says, "There is no impetus for us to convert off of NetWare." Like most of the NetWare faithful interviewed, he insists his loyalty is not blind.

"I don't have a problem moving to NT 5.0. That's why I'm on their [beta-test roster], but it has to make monetary sense for me to move," Clark says. "I'm not going to move just because everybody else is jumping."

Clark also questions whether those making the leap are doing so too hastily.

"People say Microsoft is the way to go, until you ask them why," Clark says. "The responses you get just blow you away: like 'everybody else is' or 'Microsoft is the future.' Well, August is the future, but I don't know what is going to happen in August."

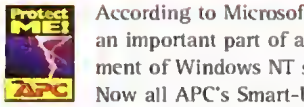
The NetWare defenders also believe they are getting the better overall deal financially. "You hear about people ripping out NetWare and throwing in NT and then finding out that the management nightmares — the soft dollars — are killing them," Easter says.

Having what they perceive to be a superior operating system is not enough to reverse NetWare's recent slide, these users agree. Novell's challenge is to reach the right people with the right message.

"They need to realize that too many corporate decision makers and IT people don't know about these strengths and that good marketing is the way to change those perceptions," Later says. "I cannot open an industry publication without seeing Microsoft. The same isn't true for Novell."

Pembroke says he fully expects NT to creep into his shop in the future, but he also intends to stand by NetWare. "We won't go to total NT," he predicts, "or I'll be gone. . . . I like Novell too much." ■

FREE PowerChute® – one more reason to count on APC reliability for NT computing



According to Microsoft, "A UPS is an important part of any deployment of Windows NT systems..." Now all APC's Smart-UPS® include Free PowerChute® *plus* software for Windows NT, providing the most comprehensive NT power protection solution available.

- **Complete protection** against the largest cause of NT data loss: power problems.

An APC Smart-UPS reacts to power fluctuations by providing instantaneous surge suppression, voltage regulation and battery backup power, ensuring that your NT system receives nothing but clean, steady power.

- **Graceful, automatic, unattended system shutdown** of Win NT and BackOffice servers protects system and data integrity by automatically storing data and gracefully shutting down your system during extended power outages.
- **FlexEvents™** allows you to plan for and control crisis situations. Want to be paged or run a command file if there is a power problem? FlexEvents allows you to customize the UPS's reaction to power events.
- **Remote UPS management via LAN and WAN and monitoring via web browser** eliminates the cost of trained personnel at remote sites to configure UPS parameters, reboot servers or diagnose power problems.
- **SNMP-ready** PowerNet SNMP Agent (included with PowerChute *plus*), adds SNMP management of UPS's protecting NT servers to all the capabilities of PowerChute *plus*. WebAlert™ and WebAgent™ provide Internet user information and alerts.
- **UPS testing/status** ensures system administrators are informed of power problems before they impact system integrity.
- **Environmental/power monitoring** allows you to quickly diagnose power problems and decrease network downtime.

"Our Editor's Choice goes to APC's Smart-UPS 1000 for its inherent flexibility and excellent software."
–PC Magazine

FREE! PowerChute® *plus* Demo Disk

Just mail or fax this completed coupon for your FREE Demo Disk. Better yet, download FREE PowerChute® plus software today at:
http://promo.apcc.com KEY CODE D904Z

☐ **YES!** I'd like more information. Please send my FREE Demo Disk.

☐ **NO,** I'm not interested at this time, but please add me to your quarterly newsletter mailing list.

Name: _____
Title: _____ Company: _____
Address: _____
_____
City/Town: _____
State: _____ Zip: _____ Country _____
Phone: _____
Brand of UPS used? _____ # _____
Brand of PCs used? _____ # _____
Brand of Servers used? _____ # _____

APC AMERICAN POWER CONVERSION
FRANCE 98 WORLD CUP
OFFICIAL POWER PROTECTION SOLUTIONS

(888) 289-APCC x7238 • FAX: (401) 788-2797

 • (800)347-FAXX PowerFax • E-mail: apcinfo@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA

APC has won more awards for reliability than all other UPS vendors combined.

Take everything you know about frame relay and forget it.

Visual UpTime shatters the idea of unreliable frame relay.

Still have the idea that frame relay isn't reliable enough for critical business applications?
Forget it.

Visual UpTime® shatters preconceived notions on frame relay reliability by radically improving performance and availability. How? Visual UpTime monitors and troubleshoots frame relay in real time so you can quickly resolve network problems and maintain optimum performance. And no system monitors SLA parameters better than Visual UpTime, with Web reports on SLA metrics such as throughput, delay, and availability. Together these capabilities ensure the WAN reliability and performance you've been demanding for critical business applications.

So forget the old ideas and embrace a new one – one that major carriers and RBOCs have embraced by incorporating Visual UpTime into their offerings. Ask your service provider for frame relay service based on Visual UpTime. If they don't offer Visual UpTime...then contact us. We'll tell you who does.

VISUAL NETWORKS®

Visual Networks, Inc.
2092 Gaither Road
Rockville, MD 20850
(301) 296-2300
www.visualnetworks.com/reliable

The WAN Service Level Management Company

Briefs

■ **Ascend Communications, Inc.** *last week declared* **second-quarter earnings** *that beat analysts' estimates by a penny. Ascend's second-quarter net profits were $59.1 million vs. $48.8 million in losses for the same time period last year. Ascend Chief Executive Mory Ejabat* **denied rumors** *that Ascend was about to buy Advanced Fibre Communications, Inc., the digital loop carrier system company.*

Ascend's Ejabat

■ *As expected,* **Cisco Systems, Inc.** *last week announced Version 1.3 of its* **CiscoWorks Blue Internetwork Status Monitor (ISM)** *for System/390 mainframes (NW, March 2, page 6). The company said ISM should help reduce costs for monitoring and controlling Cisco routers from the mainframe.*

Users can statically define routers in ISM, or ISM can discover them automatically when NetView receives an alert from a previously unknown router.

The performance of channel interface processors (CIP) in those routers can be monitored as well. CIPs attach routers to IBM mainframes. ISM will be available Aug. 1 for $14,995.

✆ Cisco: (800) 553-6387

■ **IBM** *last week announced it was* **canceling plans to withdraw the 3745 Communications Controller Model 170.** *IBM said the box is used for customers migrating from the 3705, the 3720 and 3725, models for which IBM will no longer provide services. The Model 170 handles small to mid-size traffic workloads.*

✆ IBM: (800) 426-4968

Cisco may need partners for voice nets

Company's lack of voice switching expertise has some believing internetwork giant will need help.

By Jim Duffy
San Jose, Calif.

Despite Cisco Systems, Inc.'s intentions to go it alone in providing voice network equipment, the company's inability to ensure global voice infrastructure reliability may force the communications giant to ally with an "Old World" stalwart.

Cisco Chairman and CEO John Chambers recently stated that Cisco will rely on its own skills to develop, service and support voice networking products after partnership talks with Lucent Technologies, Inc. and Nortel collapsed. Chambers also ruled out merging with a major voice vendor and characterized companies such as Lucent and Nortel as Old World establishments trying to compete in a New World environment (*NW*, June 29, page 8).

Yet Cisco's ability to service and support global packet- and circuit-switched voice networks — much less develop voice products in a timely manner — may not even be up to Old World standards, analysts suggest. In a business where carriers and their subscribers demand 24-7 uptime and 99.9% reliability, the name Cisco may stir up more fear than comfort.

"As Sprint looked at partnering with Cisco on the ION, we recognized that they in fact did not have the voice telephony and reliability knowledge on how you structure those services."

Marty Kaplan, senior vice president and chief technology officer at Sprint

"Cisco must prove that it has the support mechanism to keep the voice switches up everywhere in the world," said Peter Alissandratos, a telecommunications consultant in Beekman, N.Y. The question, he said, is can Cisco achieve time to market for reliable voice products, and increase and organize its support mechanism for the products. "If the answer is yes, [it will be the first time] it happened without a merger or technology purchase. If no, then Cisco must find the right [large] organization to merge with," Alissandratos said.

Gartner Group, Inc. recently analyzed carrier perceptions of vendors and vendor ATM equipment. As far as equipment was concerned, the result favored Cisco and others; but from a trust and comfort level perspective, the results clearly favored the Old World players.

"What [carriers] really wanted was to be able to buy equipment from either Nortel or Lucent because they considered them top-tier players; they trusted them. [These companies] know about central office support requirements and 24-7 and rapid response when they run

See Cisco, page 28

IBM puts life back into old network gear

By Marc Songini

For those users looking to save big bucks on their network hardware purchases, IBM is offering an extensive lineup of discounted used equipment.

According to IBM, if customers are willing to purchase used goods, they can save as much as 20% on the entire hardware, software, services and warranty package. Users may see even greater savings when buying individual pieces of hardware (see graphic).

You name it, IBM's got it — hubs, routers, switches, servers and even OEM gear. "There's not only a full line of networking equipment, there is every product IBM sells, from PCs up to the largest mainframes," said Pete Matthews, director of global remarketing for IBM's financing group. "You see a lot of Cisco routers in our portfolio," he added.

IBM harvests used equipment from customers that have finished their lease, want to sell their used equipment or upgrade their network equipment to the latest hardware. For instance, if a customer has a 3745 Communications Controller and wants to upgrade it to a more current model, IBM might take the 3745 back and then sell it to another customer who may get plenty of mileage out of the product.

After IBM takes back a piece of equipment, it will clean, test, repair and reconfigure it according to a customer's requests.

"We will customize equipment configuration to the user's requirements," Matthews said. "We'll be happy to add memory, channels, change models and deliver a customized offering." All the used gear comes with a 90-day warranty. Matthews said IBM has some 200 people working on refurbishing networking products.

Availability of products varies, depending on what IBM takes in. For interested buyers, there are various channels through which to buy the equipment. IBM sells it directly, and some IBM business partners can retail it, as well. Matthews said every month IBM issues a faxed list of the available items to interested IS personnel.

"Over the years, we've acquired a lot of used equipment, and we've never had a problem," said Wayne Wallace, first vice president, data center management, at Seattle-based Washington Mutual Bank. Recently, he needed to buy used equipment — two 3746 Nways Multiprotocol Controllers and two 3745s — to connect his network with that of a newly acquired bank in California. The boxes handle SNA and IP over a network with 775 remote offices.

"We did it because we had to move fairly fast," said Wallace, who needed to standardize the net. To do this, he decided to reconfigure the environment in Seattle by replacing the existing 3746s with models that would be comparable to the 3745s in California. He picked up the first 3745 in April, and soon after, IBM delivered the remaining four boxes. Wallace said they are holding up fine.

✆ IBM: (800) 436-4968

Tired and true

Here are some examples of the cost savings when you buy a piece of refurbished gear from IBM:

Product	Price new	Refurbished
2210 Router	$2,854	$1,200
8230 hub	$2,630	$1,100
3745 Communications Controller	$28,950	$7,000
S/390 Model 9672/r61	$325,000	$157,000

Get more online:

- **A link to IBM's refurbished equipment Web site**

8042

www.nwfusion.com

Cisco

Continued from page 27

into bugs," said John Coons, director and principal analyst for wide area networking at Gartner's Dataquest, Inc. company. "I don't know that any of those second-tier players [which include Cisco] either fully understand, [are] fully staffed or have much experience in supporting the traditional carriers. None of them are at the point where Lucent or Nortel are at."

Cisco begs to differ. The firm has service-level agreements with "a couple of large telcos," said Ethan Thorman, director of marketing for customer advocacy within Cisco's Service Provider line of business. Thorman would not disclose the identity of these telcos, citing nondisclosure agreements.

"I think one of the things that is often overlooked is that the environment that the Old World players have is just not well suited to what is involved with the new voice-over-IP infrastructure," Thorman said.

For carrier nets, Cisco is leveraging some of the "electronic tools" it uses for supporting enterprise networks, such as advance warning systems, diagnostic monitors, and product repair, upgrade and availability data, Thorman said. This facilitates more rapid knowledge exchange than putting a lot of people on-site, he added.

Cisco will also soon unveil Cisco Framework, a blueprint of service and support "methodologies" and "best practices" for deploying packet-based multiservice networks, Thorman said. When asked if Cisco is aggressively recruiting people with voice-switch experience, Thorman said the company inherits voice expertise from companies it acquires, such as the $236 million purchase of NetSpeed, Inc. in March.

Lastly, Cisco will continue to partner with companies that offer expertise in areas where Cisco can not, such as service and support for circuit-switched gear. Thorman would not comment on the prospect of a merger with a telecom giant, but he did not rule it out.

"We are never going to become a major service company like the companies we compete with," Thorman said. "I don't think any one company has all the answers. I certainly can tell you that [Lucent and Nortel] don't have a lock on all the answers. They lack the perspective of what they have to do to compete in the New World environment."

Partnerships would suit Cisco customer Sprint Communications Co. just fine. Cisco is a major supplier for Sprint's new Integrated On-Demand Network (ION).

"As Sprint looked at partnering with Cisco on the ION, we recognized that they did not have the voice telephony and reliability knowledge on how you structure those services," said Marty Kaplan, senior vice president and chief technology officer at Sprint. "That's why we brought Bellcore into the picture."

Sprint will also continue to rely on Nortel for ION's circuit-switching reliability. ■

Memotec boosts video pack

Device squeezes video onto frame relay nets.

By Tim Greene

With voice-over-frame relay finally becoming standardized, vendors are turning their attention to video-over-wide-area frame relay links.

Memotec Communications, Inc. last week announced Video Framer, a device that translates a video bitstream into frames for transport across a WAN.

The device, for example, can take ISDN video traffic and drop it onto a less expensive frame relay link.

The device can tie a wide-area line directly to a frame relay link or sit behind a router that is connected to a frame relay net. Video Framer is connected locally to a video codec.

Because video is generally an occasional-use application, it can be squeezed onto a frame relay WAN circuit that is used for other applications, according to Memotec.

A nice supplement

While the product might be attractive to a current frame relay user, it will not drive new customers to frame relay, said Craig Driscoll, an analyst with The Yankee Group in Boston.

"This is not something where you think this is the be-all and end-all, but it is a nice supplement to other frame relay applications," Driscoll said.

If Video Framer is used in conjunction with a router that can prioritize traffic, video can be given precedence over other traffic to ensure that the quality of the video is maintained.

Depending on the congestion of the line, other traffic will be squeezed out to some degree.

Supports a range of bandwidths

Video Framer can be set to accommodate bandwidths from 56K bit/sec to 384K bit/sec, depending on the bandwidth available and what quality video is required.

At 384K bit/sec, the device can support high-resolution, 15 frame/sec video. As available bandwidth decreases, either the number of frames per second or the resolution of each image can be reduced, Memotec said.

Video Framer supports point-to-point videoconferencing only, and a Video Framer is required at both ends of the connection.

A multipoint conference unit would have to be placed between the Video Framer and codec to accommodate a conference on more than two sites.

Video Framer does not support LAN-based videoconferencing based on the H.323 standard.

Video Framer is available now and costs $2,995.

✆ Memotec: (514) 738-4781

Optical mux aims at enterprise nets

By Marc Songini
Ramsey, N.J.

Enterprise users looking to deploy wave division multiplexing (WDM) to handle large volumes of traffic can check out a new device from ADVA Optical Solutions, Inc.

ADVA has doubled the maximum number of channels in its high-end Optical Channel Multiplexer (OCM) line, which offers users a way to transmit large quantities of data, video and voice over a fiber backbone. WDM uses the colors of light, or optical wavelengths, to send data over a single fiber channel.

WDM works by bringing together multiple datastreams from PCs or video cameras and converting the data into distinct colors before transmitting them across a single channel on a fiber backbone. A second mux is required at the other end of the link to convert the optical data back into its original form.

The new OCM device has 16 channels. ADVA also offers four- and eight-channel OCM models. Users can upgrade from the eight-port model to the 16-port model without taking the existing box down. ADVA said it can use WDM over a single pair of optical fibers spanning distances up to 31 miles. OCM operates at speeds from 10G to 1.2G bit/sec.

Analysts said WDM devices would be most cost-effective for users who need extra capacity in their existing fiber backbones but who can't add fiber.

Brian McCann, president of ADVA, said the WDM market has "been going bananas" and is currently worth about $2.5 billion.

But the technology has been used more freely by service providers speeding up their backbones than in private nets. "It hasn't been very successful in the enterprise because WDM carries a premium cost," McCann said. That situation is something ADVA is trying to remedy, he said, by shrinking OCM's $20,000-per- channel cost by 50% in the next 12 months.

ADVA sells typically to large enterprises that need to connect sites within a metropolitan area. "The target customer for [the OCM] is Fortune 500 and large banks and financial institutions," McCann said.

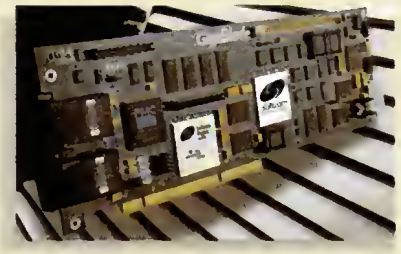
McCann said ADVA's primary competitor is IBM, with its 9729 WDM box. ADVA's OCM supports Gigabit Ethernet and OC-12 connections, while the IBM box does not, McCann claimed.

The new OCM will be available in the fourth quarter. The price for upgrading existing OCMs will start at $72,000, McCann said. Additional ports will cost $12,000 each.

✆ ADVA: (201) 995-0080

QUICK TAKE: SOFTCOM MICROSYSTEMS

Stepping on the network accelerator



Start-up Softcom Microsystems, Inc. is looking to speed Internet access by 50% with a new single-chip broadband network processor.

The company last week announced the 64-bit SoftcomEngine processor, a so-called network accelerator that can perform a mix of traffic- and protocol-processing functions now handled by software, said company executives. SoftcomEngine will be incorporated into GigaBlade, an adapter that will fit into multivendor Gigabit Ethernet devices, Layer 3 switches, digital subscriber line access multiplexers and IP backbone routers.

Softcom will sell the GigaBlade card along with its BladeRunner API software suite and Internetworking Development, Evaluation and Application (IDEA) Platform system to network hardware vendors. The challenge will be convincing vendors that they need the product, analysts said.

GigaBlade will support OC-3 and OC-12 Synchronous Optical Network (SONET) links. OC-48 support is planned for the future. BladeRunner software provides ATM LAN emulation, Packet-over-SONET and IP-over-ATM protocols. A base configuration of GigaBlade with dual OC-3 ports is $1,495, while the base configuration for OC-12 is $2,495. The IDEA Platform development system starts at $15,000. It is available now. Softcom Microsystems is privately held, backed with venture funding from Sequoia Capital and Sevin Rosen Funds.

Softcom: (510) 497-3960

Briefs

■ **AT&T executives and FCC Chairman William Kennard** *have finally found some common ground in their war over* **who should pay for expanded universal service**— *carriers or users.*

FCC's *Kennard*

The FCC's Kennard, who blasted AT&T for passing along universal service fees to users, also said that if the carriers blame the federal government for the new service charges, the carriers must also disclose to users that the **government is forcing the reduction of local access charges.**

As a result, the portion of AT&T residential bills describing the new universal service surcharge includes the following statement:

"The FCC has also reduced the fees AT&T pays local phone companies to connect toll calls. That's one reason our prices for long-distance service have continued to come down over the last decade."

■ *New broadband IP carrier* **Level 3 Communications, Inc.** *last week made an acquisition that boosted its chances for overseas expansion and brought it yet another former WorldCom International, Inc. executive.*

Level 3 **acquired UltraLine, Ltd.,** *a start-up carrier offering high-speed transatlantic service. UltraLine was founded by* **former WorldCom CEO Colin Williams,** *who spearheaded the international operation of MFS Communications Co., the provider of metro-area networks that merged with WorldCom in 1996.*

Level 3's leadership is largely drawn from WorldCom and MFS veterans (NW, Jan. 26, page 1).

Qwest ups legal ante to salvage RBOC deals

Strategic deals with Ameritech Corp., US WEST, Inc. at a standstill following FCC action.

By David Rohde
Washington, D.C.

You can say this for Qwest Communications International, Inc.: The new national carrier can mix it up in the courtroom like any old-line telecom giant.

In the midst of uncertainty over the future of the telecom industry, Qwest is pulling out all the stops to salvage deals with Ameritech Corp. and US WEST, Inc. that could bring Qwest much-needed revenue.

Those deals authorize the two regional Bell operating companies to offer Qwest long-distance services as sales agents.

The Federal Communications Commission on June 30 blocked the Ameritech deal for 90 days in what it called a "standstill" order. The FCC said it needed time to review the deal and feared that if Ameritech signed up customers for Qwest in the meantime, confusion would reign if the deal were later ruled illegal. But on July 6, Qwest lawyers demanded the FCC stay its own order, claiming the standstill would cause "irreparable harm."

On July 9, FCC Common Carrier Bureau Chief Kathryn Brown denied the stay request in rather testy language. Brown noted Qwest had announced it would continue to market its services in Ameritech's territory. "The commission adequately considered Qwest's claims of injury, which under no applicable standard can be termed 'irreparable,'" she wrote in her ruling.

Qwest does need to press on the legal front, said Robert Rosenberg, president of Insight Research Corp., a telecom consultancy in Parsippany, N.J. "They need revenue as fast as possible to pay down their debt," Rosenberg said. "Why else would they be inking these deals as quickly as possible with companies that will probably someday be their competitors?"

Stephen Jacobsen, Qwest's executive vice president of marketing, said that's an "absurd" assertion. "The reason we're fighting so hard for [these deals] is that this is a great opportunity for Qwest," he said.

However, Qwest's other deal, with US WEST, has been blocked by a federal district court in Seattle. Qwest demanded that AT&T and other carriers that filed to stop the deal post a $4 million surety bond. Qwest claimed it needed this amount to "minimally insure" itself against the "lost profits and customer acquisitions."

Qwest's legal offensive comes amid a separate series of actions that could undermine the structure set up by the Telecommunications Act of 1996 to

See Qwest, page 30

The geography of a legal war

Federal courts across the country are involved in the fight over whether RBOCs should be able to enter long distance:

Seattle
Federal district court rules US WEST cannot offer Qwest long distance as a sales agent.

Chicago
District court rules Ameritech might be able to offer Qwest long distance as a sales agent but refers the matter to the FCC.

Wichita Falls, Texas
District court rules the telecom act unfairly singles out RBOCs for special conditions to enter long distance.

New Orleans
Appeals court now hearing an appeal of the Wichita Falls ruling filed by AT&T, MCI and others.

Washington, D.C.
The FCC blocks the Ameritech/Qwest deal for 90 days while it examines the issues. Qwest appeals the FCC's order.

WorldCom blends IP offering

By Denise Pappalardo

WorldCom, Inc. is pulling together its newly formed Internet division, but the company has some loose ends.

In May, after absorbing ANS Communications and CompuServe Network Services, WorldCom announced a reorganization plan for its Internet divisions. The two acquired companies were melded with WorldCom's existing Internet properties, UUNET Technologies, Inc. and GridNet, to form WorldCom Advanced Networks (*NW*, May 11, page 12). Now WorldCom's IP services, including virtual private networks (VPN), Web hosting and application hosting, fall under one umbrella called WorldCom Advanced Networks. But the umbrella is nothing but a façade to one business user.

"We spend $3 million plus with [ANS] per year, and we don't know squat," said David Norton, a network architect at the Piscataway, N.J.-based American Standard Companies, Inc.'s Global Network Services division. For four years Norton has used ANS' Virtual Private Data Networking services and Interlock managed firewall services.

WorldCom's *Van Camp says integration plans are on track.*

American Standard has not been able to get a straight answer from WorldCom Advanced Networks about which of the many VPN services it plans on keeping and which will be discontinued.

American Standard had been planning since last year to expand its extranet, but postponed that project because of acquisition turmoil at ANS, Norton said. But according to WorldCom, the new division plans to support ANS firewall and managed firewall services.

One ANS service that will be discontinued is SureRemote dial-up VPN service.

UUNET's ExtraLink and ExtraLink Remote products are also in a state of flux.

These services, which overlap with other WorldCom Advanced Networks VPN services, are still being sold through a separate UUNET sales channel as opposed to being sold through WorldCom Advanced Networks. This means if a customer puts out a request for proposal for a dedicated VPN service, the customer could get a bid from UUNET for its ExtraLink service and another from WorldCom Advanced Networks for its Virtual Private Data Network service.

"Some of my end-user clients that were looking to acquire service remnants of ANS and UUNET were approached by different sales teams," said Joel Maloff, president of Maloff Group International, a Dexter, Mich.-based consulting firm.

But WorldCom Advanced Networks President Peter Van Camp said the Internet division is right on track. From the start, the ISP division of WorldCom stated it would not have the companies completely integrated until year-end.

Kristi Essick, a correspondent with IDG News Services' London bureau, contributed to this story.

Sprint backs up its Managed Firewall

By Denise Pappalardo

When it comes to guaranteeing firewall performance, Sprint Corp. is putting its money where its mouth is.

Backed by the promise of refunds on users' bills, Sprint last week introduced IP Security service-level agreements (SLA) that offer the carrier's Managed Firewall customers guaranteed server availability, response time for fixing hardware, handling of network changes, notification of critical events and monthly report delivery (see chart).

A 10% guarantee

For each guarantee that Sprint fails to meet, it will refund 10% of a Managed Firewall customer's monthly bill. While analysts agree that most service providers use SLAs to bring new customers through the door, SLAs also show that a service provider is confident in its offerings.

For the past two years, Sprint has provided virtual IP Security SLAs for Hebenstreit Communications Corp. (HebCom), said Roger Nickie, MIS director at the Albuquerque, N.M.-based enhanced directory assistance services company.

"Our firewall server has never gone down," Nickie said. When employees leave or are fired from HebCom, the company often requests a critical policy change be made to its firewall. "Sprint rarely takes longer than an hour to make those types of changes," he said.

Sprint's new SLAs are proactive guarantees, meaning users should expect to see refunds on their next bill if Sprint doesn't meet any one of the guarantees, regardless of whether the user calls to complain or not.

While Sprint has many competitors in the Managed Firewall service arena, including GTE Internetworking and AT&T WorldNet, no other ISP is offering SLAs for their firewall services.

Sprint's Managed Firewall pledge

Sprint's implementing service level agreements for its Managed Firewall services that will refund 10% of a customer's monthly bill for each guarantee not met. The SLAs include:

- The promise of 100% firewall server availability.
- A guarantee that failed hardware will be fixed within four hours from the time an outage is detected.
- A promise that firewall policy changes filed with Sprint by 10:00 p.m. will be processed by 6:00 a.m. the following morning.
- Assurance that critical-event firewall policy changes will be processed within two hours.
- Printed monthly reports that will be delivered to users no more than 10 days after the last day of the month.

Stripped down

In addition to new guarantees, Sprint also announced a stripped-down version of its Managed Firewall service. Sprint's new Level 1 Managed Firewall service offers users the same firewall server options; either a CheckPoint Software Technologies, Ltd. or a Raptor Systems, Inc. firewall server; and the same 24-7 management features as its original service, now called Level 2.

But Sprint's Level 2 service also offers individual user dial access authentication features, such as management support for Security Dynamics SecurID token system and daily firewall vulnerability tests.

Level 1 does not support individual user authentication management and only supports weekly firewall vulnerability tests.

Managed Firewall Level 1 is available now for $995 to $2,000 per month. The Level 2 service starts at $2,000 per month and can cost as much as $20,000 per month depending on software, hardware and management options. ■

Get more online:

- **More details of the announcement from Sprint**
- **A link to Sprint's managed security services**
- **Past articles on Sprint's firewall offerings**

www.nwfusion.com

Qwest

Continued from page 29

bring RBOCs into the long-distance picture.

A federal appeals court in New Orleans is now hearing an appeal filed by the FCC to overturn a December 1997 ruling by a federal judge in Texas invalidating a key part of the act. The provision requires RBOCs to meet a 14-point local-competition checklist before entering the long-distance market. AT&T and MCI Communications Corp. are supporting the FCC's appeal, and experts say they have good chance to win.

The Texas judge ruled that the checklist is an unconstitutional "bill of attainder." That's an old legal concept that prohibits legislatures, such as the U.S. Congress, from singling out individuals for special punishment. Only courts can mete out such punishments, according to lawyers for SBC Communications, Inc., which brought the original lawsuit.

In an earlier hearing, one of the three judges on the appeals court panel reportedly expressed doubt about SBC's theory because bills of attainder rarely apply to corporations. ■

WAN MONITOR

Drooling over WAN apps

Are your users tired of staring at that darned little hourglass on their PC screen, waiting for an application to download?

Your users may be in jeopardy of contracting Hourglass Syndrome, a deterioration of the brain often characterized by the user entering a semivegetative state and in severe cases, babbling obscenities intermittently or unconsciously drooling. It's not a pretty sight.

Before you start looking at upgrading lines or changing WAN hardware to speed those downloads, you need to take a look at the applications you're running. The WAN is nearly always an afterthought when companies make decisions about what applications to deploy. And yet there are some applications that are designed and written to be WAN-friendly, and many more that are not.

If an application is performing poorly over the WAN, throwing bandwidth at the problem may not provide a solution. If a higher layer — or the way the application has been designed and written in the first place — causes the problem protocols, more bandwidth won't improve a thing.

If you are running client/server applications over the WAN and are not happy with the performance, it may have nothing to do with whether you're using private lines vs. frame relay vs. an IP network. It may have nothing to do with the speed of your access, port connections or WAN links.

Instead, it may be that you've selected an application with a traditional two-tiered architecture instead of the more WAN-friendly three-tiered architecture.

Two-tiered architectures, such as those found in client/server applications, are written in a way that requires a great deal of "ping-ponging" of information from the remote client to the server.

In fact, the client might request and assemble the needed information using a whole series of SQL requests back to the central information repository.

It is this constant ping-pong of little bits of information back and forth over the WAN that causes the hourglass to spring up on users' PCs, giving them the perception of poor network performance.

Daniel Briere
Christine Heckart

However, some client/server applications are designed to run well over the WAN. SAP applications are WAN-friendly, as is the latest release of PeopleSoft. This is because a three-tiered architecture is being used. The PC at the remote site becomes a presentation server, which is connected over the WAN to an application server.

The application server is locally connected to the data repositories so that information can be assembled into a full-screen update or a batch file and then transmitted over the WAN.

Other options for improving the performance of delay-sensitive applications may include increasing the application's window size if the application is based on TCP, reducing the number of WAN hops and overtuning the protocol parameters at Layer 4 and higher, if that's possible.

It also helps to have network design tools that let you model specific applications over the WAN. If you want to get really accurate, you can first deploy network analyzers to gather specific information about the performance of your applications and the characteristics of the traffic. Some service providers will then help you with the data collection and the modeling.

For example, we recently got a demonstration of AT&T's Perf Tool, and we were impressed with the package's sophistication and the amount of application-specific benchmark data AT&T has gathered for different applications and protocols.

According to Tom Siracusa, district manager of AT&T's data network design group, if you don't know the specific performance characteristics of your SNA or SAP application, the group has a whole library of statistics on standard applications and can provide typical defaults for a whole set of variables.

PerfTool shows you how the application's performance will change as network characteristics are varied. It takes the black art of designing a frame relay or IP network and turns it back into a science, while keeping your users mentally healthy.

Briere is president and Heckart is vice president of TeleChoice, Inc., a consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

Briefs

■ *San Mateo, Calif.-based start-up* **Harmony Software, Inc.** *this week announced it is developing a business-process management application based on* **Microsoft Active Desktop** *technology. The software will let*

Harmony's *Carla and Brian Gardepe*

business managers download information from multiple Enterprise Resource Planning applications to their desktops for up-to-date information on inventory, supplier delivery and cash flow. The Harmony application is expected to cost at least $100,000. The founders of Harmony, husband and wife team Brian and Carla Gardepe, said their start-up has gotten technical and capital assistance from Ernst & Young and KPMG Peat Marwick.

✆ Harmony: (650) 696-9580

■ *Lotus Development Corp.'s* **eSuite WorkPlace,** *a set of Java-based office productivity applications, will be available this week on Sun Microsystems, Inc.'s* **JavaStation.** *Currently, eSuite runs only on IBM's Network Station Series 1000, although Lotus said it will support other computers by the end of this quarter. The retail price of eSuite is $79 per seat. Lotus is offering 120-day free trials and $30-per-seat purchase discounts to customers who also buy Sun's Netra j server.*

✆ Lotus: (617) 577-8500

■ **Documentum, Inc.** *of Pleasanton, Calif., last week unveiled its Enterprise Document Management System 98 (EDMS 98), which the company claims will give customers unparalleled end-to-end life-cycle control over a wide variety of document types.*

✆ Documentum: (510) 463-6800

Moss to cover new Web data model

By Robin Schreier Hohman
Portsmouth, N.H.

With the help of Java, CORBA and Microsoft Corp.'s DCOM, the World Wide Web is supposed to enter a golden era of distributed computing. But according to ex-Tivoli Systems, Inc. Chief Frank Moss, there is one big problem: All this stuff is too darn complicated.

"Everybody thought that [the Common Object Request Broker Architecture], [the Distributed Component Object Model], Java and ActiveX were going to simplify programming," Moss said. "It didn't simplify it. It's the same way people think that network computers are going to simplify management. All the complexity ends up at the server."

Moss, fresh off a successful seven-year stint at the helm of Tivoli, jokingly describes himself as a "serial entrepreneur." His new company, Strategic Software Ventures LLC, will fund software start-ups in Boston; Austin, Texas; and Portsmouth, N.H.

The first venture to be funded by Strategic Software is temporarily called Bow Street Software, named for the street than runs down the center of town here. And if the dynamic, Baltimore native knows anything about this industry — and you'd be hard-pressed to find someone who would say he doesn't — Moss is betting that Bow Street will change the way business is done on the Internet.

Although shy with the details, Moss said Bow Street's first mission will be to find a way to aggregate data into a live shared data object that can be dynamically updated in real time. The way to do that, Moss said, starts with Extensible Markup Language (XML).

XML is a new specification drafted by the World Wide Web Consortium that lets users create customized tags to do things HTML can't — namely structure data in a predictable way. XML goes beyond HTML by describing the data itself, not just indicating a way for data to be displayed.

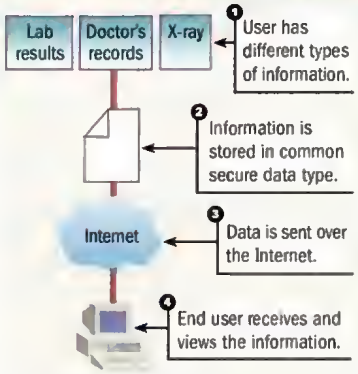
Moss wants Bow Street to use XML to build an infrastructure in between corporate data and the Web that gives IT departments fuller control over the data sharing process.

In his scheme, the way you link the data captures the business logic. If you can protect the data and secure the links, it's a better solution than erecting firewalls, he said.

"The data becomes the application," Moss explained. ■

Easing data flow

Moss' new venture offers a common format:



PROFILE: BOW STREET SOFTWARE

Founded:	1998
Location:	Portsmouth, N.H.
Principals:	Frank Moss, Jack Serfass, Joe Sommers and David Sweet
Funding:	Strategic Software Ventures LLC, Weston, Mass.
Mission:	"To change the idea of what an application is all about"

In-Site

Data warehouses worth filling

By Ellen Messmer

By next January, two prominent Canadian banks — the Bank of Montreal and the Royal Bank of Canada — are expected to blend into a single financial institution.

The first thing the banks plan to do is combine the information contained in each bank's data warehouse, which acts as the repository for account information and marketing analysis.

A sensitive operation

Fortunately, both the Bank of Montreal and the Royal Bank of Canada use IBM's DecisionEdge AIX-based data mart, which runs on IBM's massively parallel Scalable Processor 2 (SP2) mainframe computer. The IT managers who are getting psyched for the merger were happy to discover the commonality. But combining the data marts, which store the daily and weekly outputs from the numerous banking applications, will still be a sensitive operation.

"A lot of work needs to be done prior to the merger, but we will probably call in a third-party consultant under nondisclosure," said Jan Mzazek, chief specialist in data mining at the Bank of Montreal. "Merging our applications will be very complicated and will take years. But we have to implement some processes quickly, and it will be easier to share information through data warehouse technologies."

Legal and regulatory constraints make it unlikely that the IT managers at the two banks will be able to freely collaborate until after the merger is officially completed. But from day one, the two banks must act like one new entity, fully blending their different banking services.

Cross-selling concerns

The Bank of Montreal uses its data warehouse along with data mining tools, such as IBM's DataMiner and Online Analytical Processor software from MicroStrategy, Inc., that let the bank figure out which customers and services are the most profitable within geographic regions.

Armed with this information, the bank attempts to market new services to existing customers in what's typically called cross-selling. With the merger, "the cross-selling issue is the most sensitive issue," Mzazek said. When the merger goes through, competitive cross-selling between the two banks must come to a screeching halt. To cull the cross-selling information, the two banks probably will share their data mart content over an IP network set up between their facilities.

IBM's *Barnes pushes outsourcing options.*

Because data warehouses require substantial upkeep in terms of "cleaning" the application data before it's pumped into the physical repository, some firms using them have decided to outsource the entire operation, noted Ben Barnes, general manager at IBM's Global Business Intelligence Solutions. ■

purchases. To drive them towards standardization, and be a catalyst for low-cost, high-octane

Better answers.™

Alpha, to the Internet and beyond. Our aim is to protect your current IT investments and make them work with future new technologies, too. For more answers, better answers, reach us at www.compaq.com/mileage or 1-800-AT-COMPAQ.

In-Site

USA Today Web site balances huge load

Use of load balancing software from F5 Labs keeps paper's servers on an even keel.

By Andy Eddy
Arlington, Va.

In its print form, *USA Today* passes through the hands of about two million people every day. The popular newspaper, owned by Gannett Company, Inc., also has kept pace in the digital age by taking its full-color content to the World Wide Web.

However, unlike regional newspapers, which generally cater to a geographic segment of the country with their publications and Web sites, *USA Today's* digital efforts must satisfy an Internet audience that stretches from Maine to Hawaii and from Alaska to Florida. Because of the vast size of its online readership, the newspaper also must take extraordinary measures, such as load balancing, to ensure that each reader will have access to the wealth of content the site is working to disseminate.

An essential element

Site traffic can exceed 55 million hits on any given day, according to Matt Maier, Internet services manager for USA Today Information Network, the newspaper's online arm. Therefore use of load-balancing hardware is more than a casual undertaking. Maier sees load balancing as an essential part of what needs to be done to keep those millions of hits from dwindling because of network saturation.

"Providing as little interruption to the customer [as possible] is the most important consideration. Not having them impacted by maintenance or putting servers into business is of great benefit," Maier said.

The approach with load balancing is quite a change from the time when USA Today Information Network used a round-robin approach to load distribution — a method in which incoming requests were doled out to each server in a group sequentially. However, the round-robin process does not route around a server that's offline. While most users got satisfactory access to content, the person who landed on the downed machine was out of luck.

Maier said switching to a BIG/ip2 setup — which includes a pair of BIG/ip2 load-balancing servers from F5 Labs, Inc. — eliminated the worry of someone being connected to a machine that couldn't dish out content.

"If a server went down [under round robin], people were still being pointed to it. As the site became larger and larger, we went with traffic management. If I take a server down right now, you won't notice it," Maier said.

Servers spread out

When a machine is down, the BIG/ip2 hardware/software combination detects it in real time, bypasses the problem device, and instead connects the user to a server that is available. The combination also uses several criteria to direct traffic. The criteria are determined by constant analysis, such as server loading, fastest response time and even some predictions based on historical data.

Currently, USA Today Information Network has its BIG/ip2 sitting in front of 11 Sun Ultra 2200, 2300 and 450 servers running under Solaris. The servers are spread out over three locations around the country, and Maier said he hopes to increase that to six this year. Multiple locations — what Maier terms "economic disaster recovery"— enable the geographic serving of site visitors transparently, which cuts down on the time to fill the user's browser window. The servers share common internal and external addresses, so the user never knows which server is providing the content.

Maier is obviously keen on the benefits of load balancing and how it helps a site like *USA Today* keep up with the rigors of a growing readership, whether it's a one-time visitor looking for a single article or a regular who counts on the site to provide news on a consistent basis. And using load balancing is a decision that he probably wouldn't reverse any time soon.

"It has a very core purpose. . . . It's single-minded. Traffic management systems as a whole are the best thing since sliced bread," Maier said. "Any large site would be foolish not to go with one." ■

PUBLISHING PIXEL BY PIXEL

***USA Today*, known as "The Nation's Newspaper," has a hefty mission to deliver online news that supplements its five-times-a-week newspaper. Here are some details:**

- The paper uses load-balancing products to direct traffic over three server locations with mirrored content in California, New Jersey and Virginia.
- *USA Today* currently uses 11 Sun Ultra servers in those three locations.
- It's estimated that the online newspaper gets between 55 million and 60 million hits daily.

'NET INSIDER

An almost complete site

I will admit to being a very big fan of Bob Dylan's music. I've been a fan since the release of his first album in 1962. I was in the audience at the Newport Folk Festival in 1965 when Dylan "went electric" with *Mr. Tambourine Man*. (We Dylan fans went through a long dry spell, but the release of "Time Out of Mind" replenishes the belief in greatness.) With this background, I was quite interested when I saw a CNN "What's new on the 'Net" segment mentioning a site dedicated to Dylan (www.bobdylan.com) and quickly took a look.

For a Dylan fan, this site is a great find, but in addition, it is about the best example I've seen of what can be done in the area of commerce using the World Wide Web.

The site contains a wealth of Dylan materials, including a list of every one of Dylan's 42 albums on Columbia Records, complete with a list of songs on each album. It includes a list of 451 songs that Dylan performed or wrote along with the lyrics of those he wrote. The site includes an engine that can search the song lyrics for any desired phrase. Also included is the text to a number of Dylan-related essays. I've seen this level of detail on some other sites, such as one that shows the playlists for (as far as I could tell) every concert Dylan has ever given. But this newfound site has the advantage of sound and a "buy" button.

There is a 45-second-or-more sample of each song from each album, which can be played using a RealAudio Web browser plug-in. In some cases, there are several samples of the same song because it appears on multiple albums. In addition, there are a number of songs that can be played full-length and a two-hour Dylan-related broadcast from the radio station KPFA in Berkeley.

You can select an album, listen to samples of the songs on the album, and if you decide you would like a copy, push the buy button to have one sent to you.

Scott Bradner

There is only one thing missing — it would be great to be able to use such a site like a jukebox and pay a few cents to hear or download a particular song. One can imagine an option for users to select a series of songs to be played or to be downloaded for playing and replaying on demand. There are a number of issues related to payment and security systems that need to be solved before this type of service can become widely available, but I recently saw a demonstration of a system that seems like it might be a start (www.a2bmusic. com/).

I recommend that anyone interested in selling over the Internet take a look at this site and learn from what it has done.

Disclaimer: I have no reason to think that Harvard is a Dylan fan, so the above exploration is my own.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Microsoft Certified Systems Engineer in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 7476, or send your questions to helpdesk @networkref.com.

Due to growth in my company, I am looking at implementing a WAN that spans multiple cities. Our long-distance carrier is stressing that I use its managed WAN offering. What are the trade-offs with this type of configuration? Should I consider implementing some type of dial backup in the event of leased-line failure?

Via the Internet

Here's a good rule to use when deciding whether you want to buy a carrier's managed WAN offering. You should try to determine how much time and effort you want to invest in doing things such as setting up the routers, plugging in all the equipment and keeping the router operating system up to date.

In one managed WAN proposal I saw recently, the customer would lease all the routers, DSUs/CSUs and other necessary equipment from the long-distance carrier. The carrier would assume all maintenance functions on the routers and DSUs/CSUs. The downside to this type of operation is that the customer would have to go through the carrier to have any changes made to the router.

Depending on what problems you encounter or features you want to implement, you may find the carrier is not running on the latest router operating system.

Whenever I work on a WAN, I strongly encourage my client to implement a dial backup line. No matter how good the carrier you use for WAN service is, it doesn't have any control over the reliability of service from the local telephone company. Your local phone company should be able to provide you with information on outages it has experienced in the past year. You need to decide how long you can afford to be down while the long-distance carrier and local phone company determine the nature of the problem.

New mgmt. tool could grow DSL services

By Dan Simone

Chances are many users have contemplated digital subscriber line (DSL) services, but few have actually been able to get their networks on it.

Many issues need to be resolved regarding DSL. For example, many products really don't deliver the oft-touted speeds of up to 7M bit/sec, and most users can count on having to deal with substandard line conditions before they can implement DSL.

Users also have to be located in an area with a service provider willing to deal with DSL implementations.

Between a lack of usable services and a heaping serving of DSL alphabet soup — asymmetric DSL (ADSL), high-bit-rate DSL (HDSL), ISDN DSL (IDSL), rate-adaptive ADSL (RADSL) or very-high-speed DSL (VDSL) — users have been left scratching their heads in many cases.

But an emerging technology, if deployed on a wide scale, could help bring DLS services to market faster: Subscriber Management Systems (SMS) from IBM, RedBack Networks and others could help eliminate some of the confusion and accelerate the deployment of DSL across the U.S.

Lightening the load

SMS technology, which can be implemented in server hardware or software, helps solve the DSL alphabet interoperability problem by accepting thousands of connections from multiple DSL Access Multiplexers (DSLAM), each supporting vendor-specific DSL implementations if necessary and translating them into IP datastreams. It then passes this IP data in aggregated form to upstream service providers over high-speed data links.

Regardless of how traffic is presented, the SMS device offloads service provider backbone routers of the heavy processing that can limit the scalability of high-speed networks.

DSLAM interoperability is particularly important to service providers because they often contract with multiple carriers to offer their customers different DSL implementations and pricing, and maximum service-area coverage.

Carriers around the San Francisco Bay area, for example, employ frame relay and ATM cell transport and symmetric DSL as well as ADSL implementations to provide different data rates of bridged, routed and tunneled data services.

An SMS server can be integrated with the existing Remote Authentication Dial-In User Service (RADIUS) database security server that service providers employ for subscriber provisioning, accounting and management. RADIUS security software includes an authentication server, client protocols and an accounting server. These pieces work together to authenticate and validate user network and application access.

As a RADIUS client, SMS servers let carriers manage DSL end users with the software already in place for the dial-up network, including custom back-office applications developed in-house. And just as it does with the dial-up network, RADIUS enables carriers to get thousands of DSL users up quickly and inexpensively.

The SMS also enables service provider flexibility in deploying a multitude of DSL services via a new management function called "multiple contexts." A context is a virtual machine with a separate administrative domain for security, accounting and management. Each context contains a unique routing entity, independent address spaces and forwarding tables, and multiple RADIUS clients to allow complete, secure data partitioning. A single SMS can support as many as 20 distinct contexts.

Deploying multiple contexts helps solve DSL deployment issues for carriers and service providers. The technology lets carriers provide wholesale services to multiple service providers.

Until now, carriers that wholesale their services have had to dedicate one physical link or device to each service provider or corporate customer.

All calls from a subscriber to a particular service provider or corporate customer have gone through a single link or device, limiting the scalability of that environment.

Multiple context technology lets the carrier create a separate "virtual SMS" for each service provider or corporate customer requiring service. The SMS dynamically matches individual subscribers to the appropriate service as part of the authentication process. This way, a carrier can quickly add a new wholesale customer simply by creating a new, unique context in the existing SMS, without any worries about address or user name conflicts with existing customers. This approach leads rapid, inexpensive provisioning.

Flexibility fix

Multiple context technology also gives service providers flexibility in creating end-user-to-network connections via a capability known as dynamic service selection.

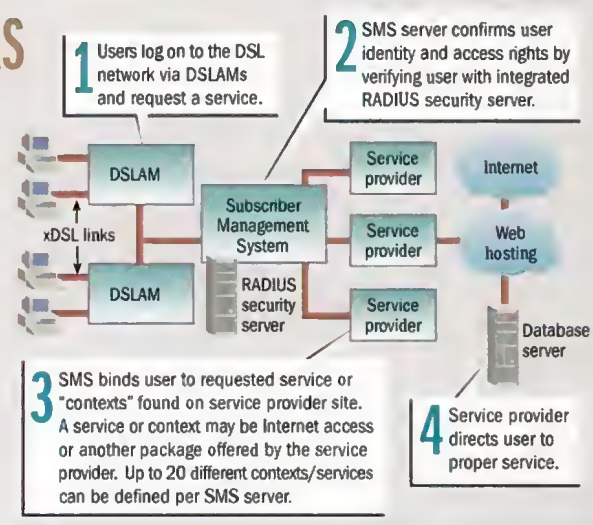
By defining multiple unique RADIUS profiles for a single end user, service providers can configure the SMS to access multiple services across the same physical link, either simultaneously or independently. By day, for example, a telecommuter can log on to a corporate access account charged to the parent company, while at night, the same subscriber can use a personal account to surf the World Wide Web.

Simone is director of product management at RedBack Networks in Sunnyvale, Calif. He can be reached at dan@rback.com.

HOW IT WORKS

Subscriber Management Systems

DSL Subscriber Management Systems are designed to help solve the DSL interoperability problem by handling thousands of con-nections from multivendor DSLAMs, each supporting different vendor-specific DSL implementations. The idea is to help bring high-speed DSL services to market faster by simplifying the task of DSL delivery.



EDITORIAL *insights*

ISPs, Layer 3 vendors — your time is at hand

The summer has been quiet — too quiet.

We haven't had a good showdown among vendors since NetWorld+Interop Las Vegas in May, when we pitted the thin-client vendors against one another in what was — and I say this with all due humility — a terrific debate. How often do you get to see IBM, Sun, Microsoft and Oracle (through its Network Computer, Inc. subsidiary) drop the marketing niceties and spar in public?

Well, we aim to get things cooking again with two new showdowns planned for the fall Internet World conference in New York and NetWorld+Interop Atlanta, both in October.

At Internet World, we'll be hosting the ISP Showdown. The goal is to put the top ISPs on stage to answer tough questions from a panel of experts and each other. Customers in the audience also get to hit the vendors with questions.

Today, ISPs are devoting marketing resources to sell you on their schemes for quality of service and virtual private networks. They're boasting about their high-capacity backbones, voice-over-IP and other key technology initiatives. How can you tell which ISP really has the best network, service portfolio and business plan for your company?

My advice? Get to the showdown and find out. The presidential debate format squeezes out the marketing hype and makes it easier for you to get your questions answered.

The ISPs won't be the only vendors coming under the *Network World* spotlight. At N+1 Atlanta, we'll be staging the Layer 3 Switching Showdown. Layer 3 switching is ground zero in the internetworking battle today, and in this session, you'll get to grill the leading vendors.

Our aim is to help you understand where Layer 3 switching fits into your network and which vendor has the best products for you.

In the coming days, we'll determine which vendors should take part in these sessions, and then we'll challenge the companies to join. So far, no vendor has declined our challenges for earlier showdowns on network management, switching, thin clients and Gigabit Ethernet.

We can only accommodate a limited number of companies, so we need feedback on those you're most interested in seeing. Drop me an e-mail, and tell us what questions we ought to be asking these vendors.

We need to hear from the ISPs and Layer 3 switching companies as well: If you think your company should be invited to the Internet World or N+1 debates, let me know why.

Then we can turn up the heat.

John Gallant, editor in chief jgallant@nww.com

Network Management • Richard Ptak

What service management will need to succeed

Everyone has heard reports of the horrific failure rates of management systems designed to handle distributed networks. Now vendors such as Hewlett-Packard Co. are pushing a more client-friendly method of enterprise management: service management (*NW*, June 15, page 25).

Service management involves committing delivery of IT services to clients in terms of those services' business contributions. For example, instead of reporting on server uptime, service management guarantees the accounting department that inventory information will be refreshed every 24 hours.

To succeed, service management must address three problems plaguing enterprise management: lack of meaningful performance reporting, unnecessary product complexity and network manager inexperience.

In enterprise management, performance reporting tends to focus on the state of individual network elements and devices. Reports of 99% uptime for servers or 85% utilization of network connections may be informative to operations managers. However, such reports do little to help business managers, who must take a broader view of the company and its services.

In service management, reports reflect the availability and performance of a business service, not the individual elements that make up that service. For example, a report would tell the sales manager how well the IT staff lived up to its commitment to provide the sales team with updated sales and order status information on a 24-7 basis. At the same time, the operations manager would get reports on server uptime and device availability, with warnings of service-degrading conditions before a catastrophic failure occurs.

Enterprise management has been much more of an art than a science because of the complexity of the products involved, many of which are customized. Combine this with a volatile working environment, where near-continuous change is the norm rather than the exception, and you have a situation likely to overwhelm even experienced enterprise IT staffers.

Service management products focus on providing predefined and preconfigured management modules. Prepackaged templates, ready-to-run models and even tools with self-learning capabilities can be applied much more quickly.

Planning and implementing the selection, installation and use of a full-featured enterprise management system is not something a network manager does frequently enough to develop a bullet-proof process. Successful systems, be they enterprise management or service management, are built using a combination of process, product and services.

All in all, service management sounds like a good bet. But before you dive in, treat it as you would any other new technology. Read reports from beta testers, conduct rigorous internal evaluations and make sure you understand the product design concept and how it fits your operations style.

Remember, a well-functioning and well-understood product that delivers as promised beats the newcomer that seems to be a perfect fit but is not quite functioning yet. Vendor development efforts that focus on improving interfaces, providing interoperability and automating implementation procedures will pay off, but remember to verify functionality before committing to a product.

Asking whether service management will replace enterprise management sets up a false choice. Service management represents the next point on the evolutionary scale, applying the same basic tool set with some refinements in delivery and presentation of results.

Ptak is vice president of systems management research for D.H. Brown Associates, Inc., an industry research and consulting firm in Port Chester, N.Y. He can be reached at rlptak@dhbrown.com.

MESSAGE QUEUE

Send letters to nwmsgq@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification

Give credit for guts

Regarding your article "A day in the life of a spammer" (June 22, page 1):

So Steve Hardigree believes that his junk e-mail business is legitimate because, among other reasons, he pays for his bandwidth? Well, good for him. But when he pays for my bandwidth that his junk mail burns up, then he's got a better argument.

That said, I'm glad to see he's got the guts to stand up and talk about what he does, which is more than a lot of other junk e-mailers do. And it looks like he's trying to run an

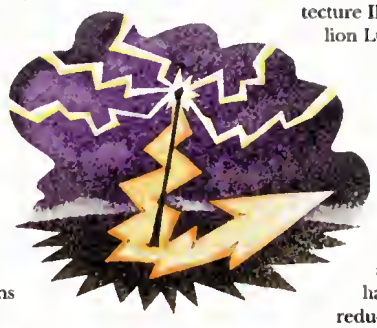
Why IP is the future of voice

In his column "The truth about voice over IP" *(NW,* June 8, page 51), Thomas Nolle dismisses voice over IP as a "niche application." This assertion ignores major carriers' decisions to migrate their voice traffic to IP networks. It also overlooks the long-term forces driving the adoption of IP as the basis for integrated networks.

Qwest Communications and GTE are building large IP telephony networks. AT&T recently announced plans to migrate its entire long-distance voice traffic to an IP platform. Deutsche Telecom is spending $2 billion on an international IP telephony network. USA Global Link, rated one of the top 50 international carriers, is installing 1,000 IP points of presence around the world. Clearly, the issue is not whether voice over IP is going to be big, but why.

Despite the claims of voice-over-IP detractors, the sound quality of phone-to-phone IP services almost equals that of the public switched telephone network. And sound delays on international private IP networks average less than 100 msec — well below the threshold of perception.

Corporate telephony managers may resist IP telephony because it involves relinquishing control to MIS departments. But the greater ease and reduced cost of providing multimedia services over IP networks combined with cost savings of as much as 5 cents per minute on voice calls eventually will tip the scales in voice over IP's favor. Boeing, a leader in corporate telephony, already has issued a contract to construct a voice intranet.



MARTY BRAUN

Critics who predict voice over IP's demise have seized on signs that the Federal Communications Commission may revoke the access charge exemption. This view is an overreaction. Voice over IP has a strong political constituency that includes the White House. Consequently, there is a good chance that the access charge for voice over IP will be the true economic cost of using the local network — 0.5 cents per minute — rather than the standard 4.5 cents per minute fee. In any case, access charges would not affect voice-over-IP providers that have their own local networks. Cable companies are developing an IP telephony standard, and competitive local exchange carriers such as ICGX are offering domestic service at 5.9 cents per minute.

Moreover, full access charges would not affect IP telephony's huge cost advantage in making international calls. By using the public Internet, international private data networks or leased transmission lines, IP calls avoid the huge termination fees (as much as a dollar per minute) foreign carriers charge.

It is at best a half-truth to claim that IP telephony does not significantly reduce network costs. Voice over IP greatly reduces the network costs of smaller carriers that cannot achieve the economies of scale large carriers enjoy. Because network costs constitute a huge barrier to entry, voice over IP encourages price competition by reducing start-up costs. Smaller carriers have doubled their share of telecom revenues from 10% to 20% in recent years by waging a price war against the industry giants. Voice over IP is their new weapon.

IP telephony lowers transmission costs by reducing the capacity required for a high-quality phone call from 64K bit/sec to as little as 12K bit/sec. Hence, the carrying capacity of a T-1 leased line to Korea that costs $100,000 per month can be quintupled or, equivalently, the same number of calls can be carried at one-fifth the cost. Also, there are big savings in switching costs. An intelligent open architecture IP switch from Arbinet costs less than $1 million vs. the $20 million Lucent Technologies charges for its 5ESS switch.

IP telephony's greatest appeal is that it allows a single IP network to carry all traffic: voice, fax, video and Internet. Substituting a general IP network for many specialized networks lowers costs. Furthermore, mixing different kinds of traffic is the natural way of providing multimedia services. Traditional networks struggle to provide multimedia services and their expensive equipment make upgrading slow and expensive. IP networks are replacing expensive, intelligent hardware solutions with inexpensive, intelligent software solutions, so upgrading involves adding new code, not relegating hardware to the junkyard. In addition, software-centric solutions reduce hardware costs because hardware need not be intelligent — cheap, dumb generic hardware replaces smart, expensive proprietary hardware.

IP telephony is here to stay. It offers large cost advantages in domestic and international calls and is the ideal way to integrate voice into general-purpose networks offering multimedia services. Relative growth rates imply that most traffic will be data in five years, and that data will be the source of most revenue growth. The natural solution is for voice to ride the data network just as data once rode the circuit-switched network. While regulation can slow this movement, it can't stop it. In 10 years, we'll be all IP.

Beck is staff manager, competitive industry analysis, for AT&T's Controller Division in Basking Ridge, N.J. He can be reached at (212) 208-2676 or rodbeck@erols.com. The opinions expressed are his own.

honest business. While I may not like what he does, I salute him for that.
Phil Reed
Toledo, Ohio

The rich get richer

Regarding your article "Feds fumble phone fund" (June 15, page 1):

When the federal government forced the local carriers to reduce access charges, it merely enriched the long-distance carriers, which pocketed the money instead of passing the savings on to users. When the government now imposes fees on the long-distance carriers, these carriers pass the fees on to the users in the form of surcharges. Did the FCC really believe the long-distance carriers would pay the new government fees using some of the profits generated from the previous government action?

The recent access fee reductions and the new universal service fees should be rescinded. Then the long-distance carriers would have no excuse for raising their bills. In order to fund a reasonable universal service program (as opposed to the lavish, ill-conceived proposed program), the government should tax the excess profits on access charges directly, instead of enriching the long-distance companies.
Marty Gizzi
Fredericksburg, Va.

The better choice

In your editorial "Can a specialist survive in Dr. Microsoft's world?" (June 22, page 42), you state: "Neither Unix nor NetWare can hold a candle to NT when it comes to ease of use and value. For most buyers, NT is powerful enough, scalable enough and familiar enough."

Using your argument that NT is cheaper and powerful enough — whatever that means — why should I buy NT at all when I can get Linux for free? Linux blows away NT. [Likewise,] Unix consistently blows away NT, and NT continues to fail when put to the test. For example, when Microsoft bought HotMail, it tried to replace the Linux server with NT and was forced to reinstall Linux because NT could not handle the load. There is a big difference between marketing hype and reality when it comes to NT vs. Unix.
Earl Mitchell
Senior member of technical staff, software group
Terayon Communications Systems
Santa Clara, Calif.

NT has its place, but an enterprise network is not it. Do you have any idea how much more time it takes to implement, administer and maintain NT in an enterprise environment? Companies will spend more just on additional support staff and personnel hours necessary to reboot the server.

I know many environments where NetWare servers have been up continuously for years without rebooting. Show me an NT server that can do that!
Cindy Cook
Houston

Get more online
More letters about E-rate and Dr. Microsoft.

Teletoons

Making your next technology decision takes courage, skill and determination. But above all, it takes accurate *direction*

The Network World Decision Support Series™

Enterprise Networking Strategies

Network World and IDC have teamed up to create a series of **new, bi-monthly research reports** designed to smoothly guide you through your most challenging technology decisions. The Network World Decision Support Series will deliver timely advice to assist you in making the right decision, every time, without fail. Each report will promptly serve up relevant industry insight, including:

User experiences - What are your peers or competitors doing?

Business cases - What is the impact on management?

What to look for in a supplier - Who offers what, where, and for how much?

Overall industry perspective - Where is the enterprise headed?

Technology assessments - What is the best route to successful implementation?

Introductory report:

Using the Internet as the Corporate Virtual Private Network

Most corporations are familiar with using the Internet for external affairs including employee access and creating a sales and marketing presence on a Web site. Now, corporate network managers are evaluating the potential of using the Internet's flexibility, low cost, security and anytime-anywhere connectivity as a solution for their high-performance private network requirements.

This report evaluates the bandwidth charges and management costs of an Internet-based corporate backbone, as they compare to traditional WAN solutions of private lines and frame relay. The cost analysis is combined with a critique of Internet performance guarantees and information security to provide a full scenario of how different workloads can be supported over such a network. Leading ISPs offering corporate intranets and VPN solutions are profiled according to the services, terms and conditions they provide, and their technology platforms. Finally it portrays real-world companies who have adopted the Internet as their corporate backbone.

To address these issues, Network World has assembled a team of IDC's most senior analysts in the areas of Internet technologies and services. The study is designed to assist buyers in better understanding how, where and when to use Internet services and technologies to support enterprise networking strategies.

Importantly, the study includes the results of IDC's research with leading end user organizations and proprietary IDC cost models, developed in collaboration with major corporations around the world.

A new topic every other month!

As a Network World Decision Support Series subscriber, you will get a new report every two months, each one offering fresh opinions on another pertinent topic. Upcoming reports include:

The New LAN Backbone - A Technology Roadmap

In today's enterprise networks, there is coexistence between ATM (for wide area networking) and Ethernet (for local networking). In the WAN backbone space, the dilemma is whether to stay with ATM switching or to use Gigabit Ethernet, the "new kid on the block". This report is a tactical guide to assist companies in selecting high-speed technologies for enterprise network backbones.

Frame Relay Directions - A Service and Technology Roadmap

Frame relay is the one service that has been used more widely for data networks in the U.S. than alternatives such as SMDS, ISDN, and native ATM. This report focuses on the longer-term strategic decision of whether or not to use Frame Relay. We will present our expectations for technology deployment, equipment and service availability.

The Network World Decision Support Series normally sells for $2995. For a limited time, we are offering it to Network World readers for

only $1995, a 33% savings!

Subscription Bonus:

Telebriefings, in-person regional briefings!

As a Decision Support Series subscriber, you will be advised of exclusive, bi-monthly phone conferences with report authors and key IDC analysts. You will also be invited to attend semi-annual regional briefings to participate in live, in-person discussions. These events are your opportunity to discuss each report, as well as the industry in general, with the authors and analysts themselves. Get the latest updates and freshest perspectives straight from the source!

Put the combined strength of Network World and IDC to work for you!

Subscribe today by calling 800-643-4668
Or, visit our Web site at www.nwfusion.com/research.

Network World DECISION SUPPORT SERIES

IN PARTNERSHIP WITH IDC

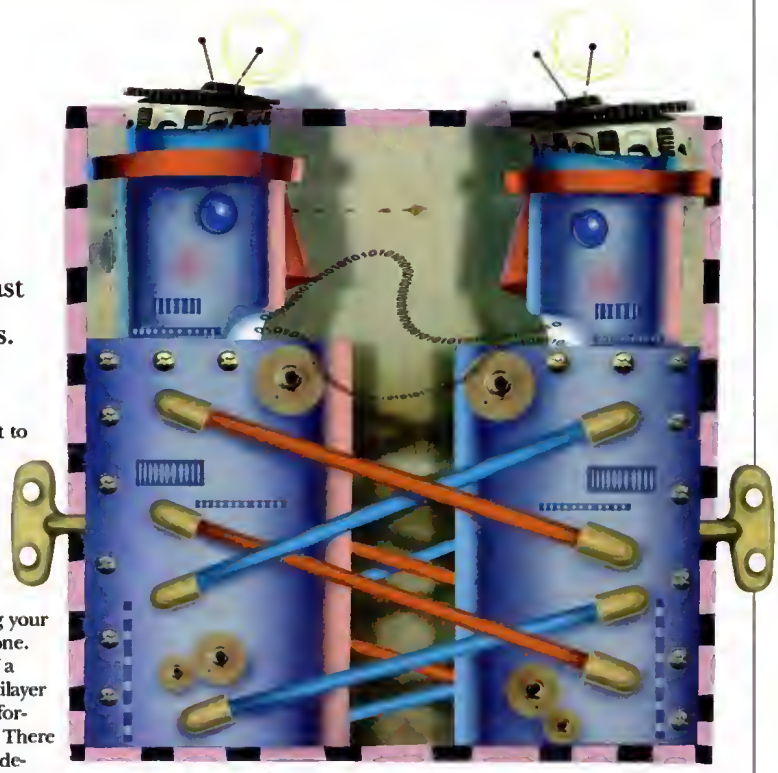
Outside of the U.S. and Canada, call 508-820-7493.

FEATURE

A GUIDE TO GIGABIT ROUTING SWITCH ARCHITECTURES AND MIGRATION STRATEGIES.

Going gigabit

By David Axner



Gigabit Ethernet has arrived in force, with at least 40 vendors shipping products of various stripes. And just in time.

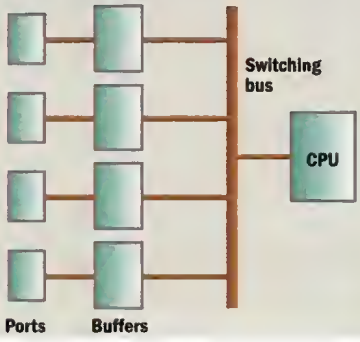
Whereas network traffic was once heavily localized, the onslaught of intranets has turned that pattern on its head such that 80% of traffic now traverses campus backbones. Bandwidth-intensive video and multimedia applications add further stress, causing the current generation of FDDI and Fast Ethernet backbones to bend under the weight. But gigabit routing switches can help shore up those sagging backbones.

Gigabit routing switches are also known as multilayer switches because they can process packets based on three or more layers of the International Standards Organization model. Operating at wire speed, gigabit routing switches outperform more expensive conventional routers, which are processor-based and depend on software to perform routing. Multilayer switches, by contrast, derive their wire-speed packet forwarding capabilities from Application Specific Integrated Circuits (ASIC) that handle routing chores in hardware.

At least that's the 20,000-foot view. When you dig deeper, you'll find there are a number of ways to build a gigabit-speed routing switch, each with its own set of trade-offs. Understanding the pros and cons of these design choices can help you make a more informed buying decision.

Figure 1
SHARED BUS ARCHITECTURE

Incoming packets from an individual port pass into a buffer, where the packet's destination address is read. The packet is then passed over a common bus to the appropriate destination port. A contention mechanism controls the traffic on the bus. This design lacks scalability, with the size of the bus being a gating factor.



Likewise, you've got to know where to put these switches to get the full benefits. It could be that you need gigabit performance only for server connections, as opposed to upgrading your entire campus backbone.

The architecture of a Gigabit Ethernet multilayer switch is key to its performance and scalability. There are three basic switch designs: shared bus, shared memory and crossbar.

Shared bus is the simplest and most cost-effective switch design. Incoming packets from an individual port pass into a buffer, where the packet's destination address is read. The packet is then passed over a common bus to the appropriate destination port. A contention mechanism controls the traffic on the bus.

The problem with the shared bus architecture is its scalability. Bus bandwidth must increase to accommodate an increasing number of ports. At some point, about 2.5G bit/sec, the switches run out of bandwidth, making them good only for the smallest of configurations. Indeed, none of the leading gigabit routing switch vendors employ this design.

In a shared memory switch architecture, conventional memory is shared among all I/O ports using a store-and-forward technique. Each received packet is passed into memory, where its address is read before the packet is shuttled to the appropriate destination port. This architecture is likewise limited in scalability; for the switch to run at full utilization, memory bandwidth must be at least twice the sum of all port capacities. Increased memory incurs greater complexity and cost.

However, vendors including Packet Engines, Inc., Bay Networks, Inc. and Foundry Networks, Inc. have been able to circumvent these limitations. Thanks in part to the plunging cost of RAM, each company has come up with a variation on the shared memory architecture in its gigabit routing switch.

The clear choice for highly scalable switches is the crossbar architecture, which calls for each I/O connection to get a dedicated path through the switch. Capacity can be easily scaled upward by adding more I/O switch elements.

Modifications must be made to the basic crossbar architecture to avoid head-of-line blocking, which occurs when an output port is busy at the time an input port is trying to connect to it. The modifications usually involve buffering and added switch elements, both of which add to the cost. Gigabit Ethernet switch vendors YAGO Systems, Inc. (which was recently acquired by Cabletron Systems, Inc.), Berkeley Networks, Inc. and Neo Networks, Inc. all use a modified crossbar architecture for the basic switch fabric in their multilayer switches.

Shared memory architectures

To reduce cost and minimize latency, Packet Engines chose a shared memory architecture for its PowerRail family of multilayer switches. PowerRail employs a parallel access design to give each port full-duplex, simultaneous access to the shared memory. Standard RAM is used as the switch's central switching fabric to keep costs down.

Eight outbound priority queues per port give users the flexibility to specify up to eight levels of priority, based on Layer 4 information. But rather than shuttle packets from an input buffer to an output queue, which is essentially another buffer, Packet Engines uses software pointers to keep track of the order in which packets should be shipped out.

Each port has its own routing engine and routing table, which can maintain 64,000 route entries. Address resolution is done at the individual port on the fly as the packet is received. This distrib-

ILLUSTRATION BY STU SUCHT

uted approach means packets are processed at wire speed at the port as they are received, not at the core of the switch. This method minimizes latency and provides added fault tolerance.

The major benefits of the PowerRail architecture are high performance and scalability. In addition, the switches come in three sizes, each of which supports Ethernet, Fast Ethernet and Gigabit Ethernet. That feature alone gives Packet Engines an edge on many vendors whose switches address only one or two categories of service. Additionally, support for FDDI, ATM and Synchronous Optical Network (SONET) is planned by year-end.

As compared to Packet Engines, Bay uses a simplified shared memory switch fabric for its Accelar switch family, which is targeted at the low to middle areas of the spectrum. All routing decisions, address resolution and queuing are done on the I/O module, as they are on Packet Engines' switches. But unlike Packet Engines' approach, queues are shared for all I/O module ports and queuing is limited to high and low priority for unicast and multicast packets.

At the low end, fixed-configuration models target departmental or workgroup applications, with support for up to 32 10/100Base-T endstations and four to eight gigabit links. Modular switches, supporting up to 12 gigabit links or 96 10/100-Base-TX ports, address small to mid-size backbone or server applications. Larger applications would require interconnecting several units.

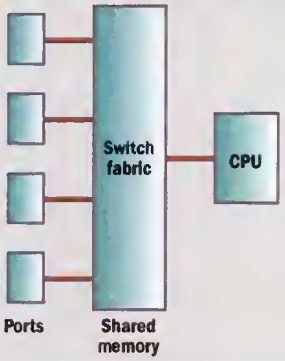
With its striped shared memory design, Foundry Networks has likewise put its own twist on the shared memory architecture used for its BigIron and NetIron multilayer switches. Each received packet is split into four segments, which are passed to separate cache memories. This speeds packet reception by reducing the time required to pass a complete packet through memory. Packets are passed to output ports at wire speed as they are being received in memory.

Memory is evenly distributed across I/O port modules (2M bytes per I/O module for BigIron switches). Layer 3 routing is performed on each I/O module for IP and IPX. AppleTalk routing is supported by software only, so performance for that protocol is similar to conventional routers. High-capacity routing tables, one per I/O module, store 230,000 entries.

Priority queuing for unicast and multicast packets is limited to four pointer-defined priority queues. Priority can be based on IEEE 802.1p or Layer 4. A future release will support priority based on the type-of-service (TOS) field in an IP packet header, which specifies how the packet is to be processed.

Figure 2
SHARED MEMORY DESIGN SHOWS PROMISE

Shared memory switches share conventional memory among all I/O ports using a store-and-forward technique. Each received packet is passed into memory, where its address is read before the packet is passed to the appropriate destination port. In its purest form, scalability is limited because of latency concerns and the cost of memory. However, some gigabit switch vendors have devised ways to circumvent those limitations, such as by using inexpensive RAM.



Foundry's NetIron switch is designed for lower end applications and has limited scalability and performance. At the other end of the spectrum are the BigIron 4000 and 8000 multilayer switches, which have large switching capacities of up to 256G bit/sec and can handle up to 100 million packet/sec. The BigIron switches address mid-size to large-scale needs, with support for 64 gigabit ports or 152 10/100Base-T ports. They are suitable for backbones, for aggregating links to 10/100-Base-T switches and for server links.

Crossbar architectures

While the shared memory architecture can be adapted for gigabit routing switches, the crossbar architecture is more naturally suited to provide the scalability required in such beasts.

Cabletron's SmartSwitch Router contains a centralized, nonblocking, point-to-multipoint crossbar switch as its switching fabric. It targets mid-size to large-scale enterprise backbone and server farm applications, with support for up to 30 gigabit ports and 120 10/100M ports.

Individual I/O modules connect to a hefty 64G bit/sec switch via a passive backplane. Each of the I/O modules contains 4M bytes of per-port buffering evenly split between input and output ports. IP and IPX routing and priority queuing, based on four levels of priority, are performed on each I/O module for the ports on that module.

This distributed architecture speeds packet processing and provides fault tolerance because each I/O module is independent from any other.

You can also pool up to eight links into a single interswitch link, which can support Layer 3 or 4 flows from Fast Ethernet or gigabit ports — a level of trunking flexibility not supported by most switches.

The SmartSwitch Router doesn't scale as high as Berkeley Networks' exponeNT switch or Foundry's BigIron 8000, but it's a strong contender for applications that don't require the extreme scalability of those switches. Furthermore, the SmartSwitch is part of Cabletron's switched network architecture, which encompasses various other types of Cabletron switches, including ATM devices. Bay can make a similar claim.

Berkeley developed a modified crossbar architecture, dubbed a "distributed output buffered switch," for the switching fabric in its exponeNT switch. The exponeNT uses extensive buffering to prevent blocking and to prioritize packets — 8M bytes per output port buffer or 50M bytes per I/O module for a maximum system buffer capacity of 400M bytes. Unlike most other switches, which use a centralized switch fabric, Berkeley subscribes to a distributed switching model. Each module contains 5G bit/sec of switching capacity for a total system capacity of 40G bit/sec.

Each I/O module contains a high-capacity routing table with 22,000 entries. And each port has four priority queues that support user-specified quality of service using IEEE 802.1p, TOS or Layer 4 application flows.

This switch is highly scalable, with support for 48 gigabit ports and 384 100Base-TX/FX ports, making it suitable for mid-size to large-scale backbone and server applications. It can also be used as a 100Base-T switch with uplinks to an aggregate switch and server farm trunks, but it doesn't support 10Base-T connections, as do most other switches. The exponeNT has greater capacity and is more scalable than the Cabletron switch, and it provides two and a half times more 100Base-T ports than Foundry's BigIron 8000. But it supports almost one-third fewer gigabit ports than the 8000.

Neo Networks' StreamProcessor 2400 is the industry giant, as well it should be because the company is targeting carriers and Fortune 500 companies. Its performance and scalability far

UNDER THE COVERS: CHARACTERISTICS OF SELECT MULTILAYER GIGABIT ETHERNET SWITCHES

Vendor/Product	Architecture	Capacity (bit/sec)	Switch fabric	Max no. of shared gigabit links in a trunk	Network protocols	Performance (packet/sec, Layer 2 and 3)
Bay Networks Accelar 1200	Shared memory	15G	Centralized	8	IP, IPX, Appletalk	7 million
Berkeley Networks exponeNT	Modified crossbar	40G	Distributed	64	IP, IPX	35 million
Cabletron Systems SmartSwitch Router	Point to multipoint crossbar	32G	Centralized	8	IP, IPX	30 million
Cisco Systems Catalyst 8540	Shared memory	104G	Centralized & distributed; 8G per gigabit module	8	IP, IPX	96 million
Foundry Networks BigIron 8000	Striped shared memory	256G	Centralized	16 (or 44 10/100)	IP, IPX & Appletalk	100 million
Lucent Technologies P550 Cajun Switch	Crossbar	22.8G	Centralized	Up to total number of ports	IP & IPX	33 million, Layer 2 18 million, Layer 3
NEO Networks StreamProcessor 2400	Distributed crossbar	512G (80 G per module)	Distributed	Up to total number of ports	IP, IPX & Appletalk	400 million
Packet Engines PowerRail Switches	Parallel access shared memory	52G	Centralized	4 (or 4 10/100)	IP & IPX	37.2 million

exceed that of any other switch, with support for up to 128 Gigabit Ethernet ports or 384 10/100Base-T ports. The switch will also support OC-48 links for ATM by year-end, which positions it for backbone connections to ATM networks.

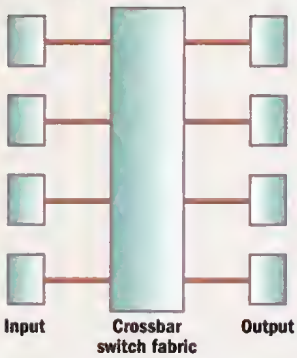
Its high performance comes from a flexible, massively parallel architecture that includes seven ASICs with more than 1,000 embedded Reduced Instruction Set Computing processors in a fully configured 16-slot chassis.

The StreamProcessor uses software and hardware to process and switch packets. Its 512G bit/sec nonblocking crossbar switch fabric is distributed across as many as six cards that plug into the back of a passive midplane.

Each I/O port module makes routing decisions based on user-defined parameters, which can be extensive. The switch's massively parallel architecture means it has thousands of CPU cycles to bring to bear on multiple tasks at once. That gives the switch the power to look deep inside packets for bit patterns and other information that can affect routing decisions. Users can program the switch to identify any patterns or information they choose, such as bit patterns that would be consistent with a security risk. And the switch can make these switching and routing decisions at line speed.

Figure 3
CROSSBAR SWITCH YIELDS BEST PERFORMANCE

A crossbar switch provides a dedicated path between input and output elements. To avoid head-of-line blocking, the design has to be tweaked, usually by adding buffers and switching elements. But it is easily expandable to accommodate such changes, making it the design of choice for high-end switch vendors.



User-defined priority includes IEEE 802.1p, TOS precedence bits and Layer 4 sockets. Dynamic first in, first out pointer queues are used for queuing to eliminate delay. And 80G bytes of switch fabric are reserved for multicast traffic.

The StreamProcessor 2400 addresses mid-size to very large scale network applications, while the smaller StreamProcessor 1000, at one-quarter the size of the larger model, addresses small to mid-size applications.

The power and sophistication provided by this switch do not come cheap. A fully loaded StreamProcessor is priced at more than $300,000. But the StreamProcessor 2400 has no competitors for applications that require maximum performance, scalability and flexibility.

Once you've determined which switch is best for you, you've got to plot a migration strategy, pinpointing key network elements. This may involve upgrading a Fast Ethernet or FDDI backbone, adding interswitch or server connections, or even links to high-performance workstations.

The network backbone should be your initial focus. To begin, determine backbone utilization over a 24-hour period by using a LAN analyzer, gathering Remote Monitoring statistics or via a monitoring application. Utilization should be no more than 70% at peak traffic periods to

insure high performance and provide a safe margin for handling the unexpected. If the backbone is already stressed by peak traffic flow — as indicated by increased response times and dropped packets — it's time to migrate to a larger backbone.

If the observed peak traffic flow is close to or exceeds the available bandwidth provided by the Fast Ethernet backbone, you've waited too long to upgrade, and drastic measures are required. Replace the existing backbone Fast Ethernet switches with Gigabit Ethernet multilayer switches and outfit them with 100M or 1G bit/sec multimode fiber downlinks to servers or high-performance workstations, depending on the bandwidth utilization of each link.

If you've got Fast Ethernet equipment from vendors including Bay, Cabletron or Cisco Systems, Inc. and your bandwidth crunch isn't quite so urgent, you may be eligible for a less costly alternative — installing a Gigabit Ethernet uplink module in your existing Fast Ethernet switch. You can then connect the existing switch to a new 100/1000M bit/sec Gigabit Ethernet switch, which would support direct connections to servers and high-performance workstations. The Fast Ethernet switch would then service only 10M bit/sec user stations.

Converting an FDDI backbone to Gigabit Ethernet entails replacing the FDDI concentrator, or hub or Ethernet-to-FDDI router with a Gigabit Ethernet switch or repeater. You'll also need Gigabit Ethernet network interface cards in the routers and hubs.

Campuswide networks that require gigabit backbone bandwidth can interlink multiple Gigabit Ethernet backbone switches. Each building within the campus can be be tied into the backbone using one or more gigabit switches. Forging multiple interswitch links, or trunks, is recommended to reduce traffic congestion and provide a safe margin in areas where there is high link utilization.

Get more online:

- **A Gigabit Ethernet overview from Ohio State University's Department of Computer and Information Science**
- **A technology overview from the Gigabit Ethernet Alliance**
- **A Gigabit Ethernet audio primer**

FIND IT ON 8022 NWFUSION

www.nwfusion.com

On the server farm

The next point of focus is the server farm. An existing Fast Ethernet switch connected to a server farm can be upgraded to Gigabit Ethernet in one of two ways.

You can outfit a Gigabit Ethernet switch with 1G bit/sec links to servers and 100M bit/sec downlinks to Fast Ethernet switches and/or endstations. Or, if more bandwidth is required, install gigabit connections to 10/100 switches, repeaters or routers. For even more bandwidth, create trunks between a Gigabit Ethernet switch and its attached servers. Trunking can also be used to route application flows over dedicated links to related servers, eliminating traffic from other application flows.

Migration to next-generation networks requires traffic analysis of an existing network and careful planning. Remember — take it slow and allow for testing. The end result should ensure network viability over the foreseeable future. Or at least for a couple years.

Axner is principal of DAX Associates, a Philadelphia-area analysis and consulting firm. He can be reached at daxner@aol.com.

REVIEW

BERKELEY AND ALTEON DEBUT SOUPED-UP SWITCHES THAT ALLEVIATE NETWORK CONGESTION.

Switching to Layer 4

By Paul Anderson and Gail James

Users rushed to embrace Layer 2 and 3 switches because they boosted overall network throughput well beyond the capacity of older technologies. When we first heard about Layer 4 switching, we wondered if we'd see a similar phenomenon. Based on our look at two of the first Layer 4 switches to hit the market, Berkeley Networks, Inc.'s exponeNT e4 and Alteon Networks, Inc.'s ACEswitch 180, we see no reason why not. Given their impressive performance and flexibility, these switches are a great fit in certain network scenarios.

A Layer 4 switch makes smarter forwarding decisions than its Layer 2 and 3 predecessors by interrogating application-level information, such as TCP port number, in each packet it receives. Berkeley and Alteon accomplish this with negligible latency by embedding the code for header interrogation in Application Specific Integrated Circuits (ASIC) in the switch.

Strictly speaking, however, the term Layer 4 switch is a misnomer. ISO Layer 4 transport protocols, including User Datagram Protocol (UDP), TCP and XNS, ensure reliable data transfer. Switching implies a connection between source and destination addresses, which does not occur at Layer 4. It would be more accurate to refer to these new switches as Layer 2 or Layer 3 application switches and to describe their function as router filtering.

Terminology aside, there's little consistency in the way vendors are implementing Layer 4 features. Berkeley's Windows NT-based exponeNT e4 is a Layer 3 switch with quality-of-service (QoS) support and firewall security, while Alteon's ACEswitch 180 is a Layer 2 switch that targets traffic load balancing, HTTP cache server redirection and network address translation over multiple servers. Both vendors' switches support all Ethernet speeds (10M, 100M and 1G bit/sec); however, Berkeley's switch is designed for large enterprise installations, while Alteon's is intended for organizations with large numbers of Web or FTP servers.

The narrow focus of these first-generation Layer 4 switches is not unusual, so don't expect to find a long list of application filters in a single Layer 4 switch any time soon. Rather, watch for more Layer 4 switches that concentrate on solving a specific problem very well. (Two other vendors — Cabletron Systems, Inc., with its SmartSwitch Router, and Torrent Networking Technologies, Inc., with its IP9000 Gigabit Router — declined our invitation to send their Layer 4 switches for this review.)

The key to shopping for a Layer 4 switch is to find one that supports the Layer 4 functions that will help you most. For many network managers, this means getting over a reluctance to install switches from multiple vendors. If managers can overcome this reluctance, the advent of Layer 4 switches may prove that performance benefits outweigh a desire for uniformity.

TWO COMPELLING ARGUMENTS FOR DEPLOYING LAYER 4 SWITCHES

Features	Berkeley Networks exponeNT e4	Alteon Networks ACEswitch 180
Max. number of ports	192 10/100 or 24 1000-SX	Eight 10/100/1000 and one 1000Base-SX
Backplane capacity	20G bit/sec	8G bit/sec
Virtual LANs	No	Up to 64
Max. IP routes	5,000	N/A
Layer 3 capable	Yes	No
Manageable via HTTP	In September	Yes
Copy port	In September	Yes
Performance statistics	Yes	Yes
RMON2	In September	No
Address translation	In the future	Yes
DNS	Yes	No
DHCP	Yes	No
QoS	Yes, first 64 bytes	No
Web browser manageable	In September	Yes
Mgmt. through modem	Yes	Yes

Performance plus safety

Berkeley Networks' exponeNT e4 Layer 4 switch allows you to prioritize traffic and firewall functions at LAN speeds. The switch includes Check Point Software Technologies, Ltd.'s FireWall-1 embedded in ASICs, which eliminates the latency associated with firewall authentication that is experienced with other switches. The exponeNT e4 QoS feature can be used to specify up to four priority levels for many common network applications (or on any field in the first 64 bytes of an incoming packet). In addition, for very special cases where security is a primary concern and traffic levels are extremely high, Berkeley Networks reports that the exponeNT e4 switch can also support load balancing of as many as four firewalls.

MORE ONLINE
For detailed descriptions of Layer 4 switches, visit Network World Fusion.
www.nwfusion.com
8023

In our tests, Berkeley's exponeNT e4 switch handled more than a gigabit of aggregated traffic while performing security authentication over a combination of 10M and 100M bit/sec Ethernet and Gigabit Ethernet ports. In fact, we found that the traffic generators, not the switch, were the limiting factor. Our tests, during which we transmitted more than a gigabit of traffic every second, were unable to significantly stress the 20G bit/sec switch fabric.

To test latency induced by the firewall function, we first ran Check Point's FireWall-1 on a separate security server and switched traffic on the exponeNT e4 switch without enabling the firewall ASIC. Next, we enabled the ASIC and again sent the same level of traffic over the switch.

Our test showed that without firewall ASIC enabled, the traffic throughput peaked at just over 25M bit/sec aggregate throughput with 96.7% firewall server CPU utilization. With the firewall ASIC enabled, bandwidth rose and CPU utilization fell dramatically: The exponeNT e4 switched secure traffic at more than 1G bit/sec aggregate throughput and only 0.2% server CPU utilization.

Berkeley's management software for switch and port configuration is among the best we've seen

for any switch or router. You can control the exponeNT e4 from either a console connection or across the LAN. A command line interface is also available for slower modem connections and telnet access. The configuration utility, which is accessed through Windows NT Remote Access Administrator, features a comprehensive graphical user interface (GUI) that's easy to use and loaded with useful features.

Berkeley's management software also provides useful statistics and reports through Windows NT Performance Monitor. Alternatively, you can configure the switch through a second Ethernet port on the switch management module. This allows you to create a separate management LAN completely isolated from the users' network.

Berkeley plans to add server farm load balancing functions and implement integrated policy control using Windows NT's Active Directory Services, Novell, Inc.'s Novell Directory Services and other Lightweight Directory Access Protocol-compatible directories. The company also plans to release a browser-based configuration utility in September and incorporate port copying functions to funnel traffic to a separate port for decoding by a protocol analyzer.

High-performance load balancing

Alteon's ACEswitch 180 provides an easy and inexpensive entry into the gigabit switch market with an added bonus: the ability to balance HTTP and FTP traffic across multiple servers. The switch therefore doesn't perform any Layer 3 functions. Instead, the ACEswitch 180 provides network address translation via a Virtual IP address and socket. Each higher level TCP/IP-based protocol, such as HTTP and FTP, typically uses one or more logical ports or socket numbers. The switch redirects requests for a given socket on the virtual server to as many as 256 physical servers' addresses.

In our test, the ACEswitch 180 did an admirable job of load balancing our five HTTP servers using round-robin or least-connections methods. With maximum connection threshold and weighted bias per server set, the ACEswitch 180 provided dynamic load balancing smoothly across all five servers as we increased traffic loads on our test bed. During the test, we shut down one of the servers to see what would happen to load-balancing functions. The switch compensated well by first removing the server from the load-balancing pool and then returning it to the pool when it was placed online again. We found there was almost no interruption of service to the clients.

Score Card

ACEswitch 180

Performance (40%)	7 x .40 =	2.80
Features and flexibility (25%)	8 x .25 =	2.00
Management (25%)	9 x .25 =	2.25
Installation (10%)	8 x .10 =	0.80
Total		7.85

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.

Alteon's switch can be set up for any TCP/IP socket, so it can handle more than just HTTP and FTP traffic; currently, however, those are the most common protocols that need to be balanced across multiple servers. You can also designate a 100Base-TX port on the ACEswitch 180 as a backup in case a gigahit-speed 1000Base-SX port fails.

QoS levels are not supported in Alteon's switch, and the switch is not truly stackable. Rather, you can connect multiple ACEswitches across their front ports. You can pool as many as four ports, in any combination of 10M, 100M and 1,000M bit/sec, into a trunk to provide up to four gigabits worth of bandwidth between switches. Considering the size and cost of these small switches, that's a lot of horsepower.

Management options for the Alteon switch include both a command line interface and a browser-based configuration utility. The command line interface is intuitive and easy to use, and it gives full access to all configuration parameters, as well as some performance statistics. The browser-based utility also provides access to complete configuration and performance statistics parameters with a well-developed user interface.

With an eye to the future, Alteon is also marketing its ACE line of switches as cache redirectors. As such, they can redirect Internet requests to local servers that store commonly hit Web pages. This feature has the dual effect of lowering Internet traffic and enabling faster response time.

Score Card

exponeNT e4

Performance (40%)	9 x .40 =	3.60
Features and flexibility (25%)	8 x .25 =	2.00
Management (25%)	8 x .25 =	2.00
Installation (10%)	8 x .10 =	0.80
Total		8.40

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.

The caching redirection features worked well for us during our test. Alteon claims its Layer 4 switches can also load balance multiple cache servers. And the company is considering adding firewall functionality to future switches.

With their ability to process application-level information in packets, Layer 4 switches offer potential performance benefits for specific applications. If you plan to support QoS on your network or you want firewall security without latency, then the Berkeley exponeNT e4 is definitely worth considering. Likewise, if your FTP or Web servers are choking on excessive or unpredictable traffic, then the Alteon ACEswitch 180 might be just what you need.

Anderson is a network test engineer at LANQuest Labs and James is the president and CEO of LANQuest (www.lanquest.com), a leading independent test lab specializing in network quality assurance, certification and performance testing services. They can be reached at panderson@lanquest.com and gjames@lanquest.com.

Net Results

	PROS	CONS
exponeNT e4 *Berkeley Networks, Inc.* *(800) 973-9764* *www.berkeleynet.com* $500 per port for 10/100 and $3,000 per port for 1000-SX	▲ High port concentration ▲ Supports QoS controls ▲ Provides external and internal firewall security without degrading performance ▲ Has redundancy features needed for enterprise-class switch ▲ Excellent configuration software	▼ High price ▼ No virtual LANs ▼ No network address translation for the firewall
ACEswitch 180 *Alteon Networks, Inc.* *(408) 360-5500* *www.alteon.com* $14,995	▲ Performs mirrored server load balancing and network address translation dynamically and smoothly for up to 256 servers ▲ Offers an inexpensive entry into the Gigabit Ethernet switch market ▲ Easy to configure	▼ No Layer 3 capabilities ▼ Not truly stackable ▼ Servers must have identical mirrored data

How we did it

Because each switch is designed to solve different Layer 4 problems, we devised a different test for each vendor.

To test Berkeley Network's exponeNT e4 switch, we first performed two tests to get a baseline on our network. The first test consisted of two computers connected with crossover cables and without repeaters to determine how fast the Ethernet network interface cards could transfer data. For the second test, we connected two computers to an NT server running Check Point Software Technologies, Ltd.'s FireWall-1. Finally, we connected the same two computers and the server running Check Point's firewall software to Berkeley Network's exponeNT e4 switch.

To test the switch's handling of high levels of traffic from multiple clients, we connected 20 PCs to the switch and the firewall and sent an aggregate throughput of more than 1G bit/sec through the switch. We used Hewlett-Packard Co.'s Netperf benchmark software to set up TCP connections between the computers and generate traffic for 90 seconds. We measured average throughput and the CPU utilization of the firewall while Netperf was running.

To test Alteon's Layer 4 contender, we connected 20 PCs to the company's ACEswitch 180 either directly or through other switches. All connections were made at full duplex. We set up Microsoft Corp.'s Internet Information Server on five PCs and configured the remaining 15 as HTTP clients. The client PCs used a Java applet designed to generate sequential HTTP requests. We set up a virtual IP address and socket on the switch, and all clients sent their requests to the VIP socket. We tested load balancing functionality using round robin, least-connections and weighted least-connections algorithms. The switch performed network address translation for all five servers with HTTP traffic only, allowing file transfers between servers during the test.

Number crunching

DCC Technology Management Group peers into technology investments to see if the firm is getting its money's worth.

By Mitzi Waltz

While some network managers cringe when their bosses ask them to quantify return on investment (ROI), Patricia Benson is armed with more data and charts than anyone would probably care to see. The managing director of San Francisco's DCC Technology Management Group is one IT professional who knows how to prove there's more to ROI than direct monetary gain.

Unlike DCC, most companies still use simplistic ways to measure the effectiveness of their technology investments, according to a survey conducted by the Cambridge Information Network (CIN), an online community for IT managers sponsored by Cambridge, Mass.-based consultancy Cambridge Technology Partners.

Almost all managers surveyed reported their companies measure ROI in the IT arena for specific objectives, especially cost cutting. However, Benson is one of only 27% who reported using ROI techniques to evaluate strategic or productivity objectives.

Scrutinizing the payoff

Benson says the trick is to speak upper management's language. A subsidiary of Dana Commercial Credit Corp., her firm measures ROI for other Dana divisions and for external clients, primarily large banking and communications firms.

"We deploy a methodology with our clients where we use a flowchart to depict their entire PC life cycle, from requisition, budgeting, installation and moves to disposal," she says. "We identify how much time each process takes and show management the associated costs." Factors considered in ROI calculations include hardware and software costs, labor hours, support costs and other hard facts related to computer ownership.

"For years, industry analysts have been throwing out numbers like 'it costs $40,000 to own a PC over its lifetime,' but the numbers weren't believable," Benson says. "We don't do fluffy things that you can't measure — productivity costs are hard to quantify and make believable in management's eyes."

That goes double for competitive advantage, a measurement that's difficult, if not downright impossible, to quantify. "How do you measure strategy? People are still having a hard time measuring things you can see," Benson says.

However, she is able to generate measurements on many factors that add up to increased productivity, competitive advantage and the like. For example, if the technical support department can use a Web help desk application to reduce the number of paid employees, that productivity gain can be measured in dollars.

When clients ask about competitive advantage issues, DCC responds by showing them ways their staffers can get more done in less time and generally with less outlay for IS. It's not as appealing as saying "buy this workstation and you'll bury the competition," but it's a realistic — and infinitely more believable — approach.

JASON GROW

Patricia Benson, *managing director of DCC Technology Management Group, keeps a watchful eye on ROI figures.*

ROI surprises

Once Benson's team assesses a client's IS system, a process that takes about six weeks, Benson makes a set of concrete, quantifiable recommendations for streamlining and changing procedures to enhance cost effectiveness.

A DCC tool called the Total Cost of Ownership Wizard pinpoints areas where technology investments don't seem to be pulling their weight and shows managers which tasks are reactive instead of proactive. The analysis identifies areas where customers can improve their processes and spits out hard figures to back it up.

Much of DCC's advice amounts to common sense, such as recommending platform standardization, but the firm also encourages its clients to use new technology to reduce equipment, support, administration and productivity costs.

"The most enlightening thing for [upper management] is identifying the benefits of moving people toward Web-based procurement and communication," Benson says.

DCC advises companies to post a list of standard PC configurations to a procurement Web page where authorized employees can directly place orders. Standardization saves money on support costs, and direct ordering cuts administrative costs, Benson says. In addition, users don't waste time researching PC configurations. "These gains have productivity results and benefits, but they are measurable, and that's the key to making managers understand," she says.

Conveying the gains to managers is probably the hardest part of ROI, Benson admits. She sums up DCC's approach with the words "charts, charts, charts."

DCC always presents data with simple, graphical charts. "PowerPoint is our friend; Excel is our friend," she jokes. DCC breaks ROI into four cost areas: capital, personnel, support and administrative. "When you drill down into those support and administrative costs, it gets interesting," Benson says.

Most managers respond enthusiastically. "They like it a lot. There are no phony projections. When you really nail down the data, they understand," Benson says.

DCC offers its clients a Java program for correcting problems uncovered during the ROI analysis, but Benson says small firms can use the same basic procedures to ferret out the big ROI picture.

Putting IT in the best light

According to the CIN survey, most IT managers view ROI as either a burdensome chore in which they have little faith or as a way to simply justify expenditures. As one survey respondent put it, "the IT department must be seen as a profit center rather than a cost center."

However, Benson says there's no reason to view ROI calculation as an empty exercise. You may not be able to put a dollar value on productivity itself, but by using measurement methods such as DCC's, you can come close enough to make managers sit up and listen.

Waltz is a freelance writer in Portland, Ore. She can be reached at infobahn@teleport.com.

Get more online:

- **Information about measuring ROI**

→ www.nwfusion.com/8045

I/S PROFESSIONALS

train on the latest technology

I/S professionals want the opportunity to work with the latest in technology, right? Well, there's only one place to find it: Liberty Mutual I/S, located in the picturesque coastal town of Portsmouth, NH. The most respected professionals from all over the country join us because of our unique training programs. We work with you in-house to develop the best business solutions for our customers and our company. Plus, our employees enjoy a wide array of year-round recreational activities, and a commute that is virtually stress free. So if you want the latest technology, and you're ready to work with one of Portsmouth's largest employers, hop on board with Liberty Mutual I/S.

Windows NT
C/C++
Sybase
DB2
RS6000-AIX
MVS/ESA
OMG/CORBA
VC++
SQL
MQ Series
Rumbaugh/OMT

Strategic Architects
Technical/Functional Consultants
Project Managers/Project Leaders
Business & Data Analysts/Architects
OO Client/Server Developers
Technical & Programmer Analysts
Database Analysts
Software QA/Test Analysts
Desktop/Network/Telecom Services

Liberty I/S has begun a major expansion of its software development centers and we have opportunities available at all levels for our strategic development initiatives. Choose from our corporate data center in Portsmouth, or our Massachusetts development center, located just off Rte. 128 in Danvers.

Please send your resume to: **Bill Hickmott, Liberty Mutual Information Systems, 225 Borthwick Avenue, Portsmouth, NH 03801.**

Fax: (603) 431-0709 • email: Jobs@Lmig.com

Liberty Mutual is an equal opportunity employer committed to workforce diversity.

LIBERTY MUTUAL.
The freedom of Liberty

Be sure to visit our web site at: www.libertymutual.com

Access for all.

Information Management & Delivery for Libraries

Do you thrive on the pressure of being indispensable?
Do you love, live and breathe the design and support of computer networks?
Are you excited about the possibility of making a difference?
Do you enjoy working in a casual, unstructured environment?

If so, then CARL can provide you with a suit-free environment and the opportunity to work with plenty of brilliant information systems professionals in beautiful Colorado.

Here is the hot position we are offering:
Senior Network Engineer
Design, document, implement, troubleshoot and maintain Company and client communication networks and associated network interfaces. Enhance the capabilities of systems by managing the engineering projects and installation efforts of subcontractors. Configure hardware, testing and support. BS in EE or technical degree equivalent and professional experience with TCP/IP, Frame Relay, ISDN and Cisco products is required. Tandem experience is ideal.

Reference Job SSE.

CARL Corporation is a leading developer of innovative technology solutions for libraries. We provide the best public access and library management tools and databases available and offer library users unprecedented access to information in intuitive, user-friendly formats. Principals only. EOE

CARL CORPORATION
3801 E. Florida, #300
Denver, CO 80210
http://www.carl.org
ph: 303-758-3030 x809
fax: 303-758-0606
resumes2@carl.org

http://www.nwfusion.com

Go to the Careers section on Network World Fusion at the above address.

Eight past weeks of Networking Careers can be found under Job listing.

Network Administrator

Provides supports and administration of local area network of PCs, NT based servers and variety of devices including hubs, routers, bridges and data communications equipment. Maintain the servers including operating system, user accounts, logs, network services, domain structure and network security. Responsible for capacity planning for the network and server storage; troubleshooting server and network problems and documentation of the network and related systems. Experience with Intranet and Internet systems a plus.

Qualifications

Training and experience equivalent to graduation from a 4 yr college or university with major course work in computer science or a closely related field and 4 yrs experience in installing, maintaining, and supporting local area networks with 1 yr recent experience in management and administration of a 500+ node enterprise wide network.

Salary

$4785-5830 pr month based on a five-step salary plan

Final File Date:

Friday, August 7, 1998. No Postmarks or Facsimiles accepted.

Apply:

Recruitment and Classification Office, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95116 (408) 265-2607 x2085 to request an application package.

E-mail:

Recruit@scvwd.dst.ca.us

Software Development Engineer III. 40 hrs/wk. 8:00 am to 5:00 pm. $60,762/yr. Develop voice mail/debit card/voice recognition customer features on ISP (Intelligent Service Peripheral) of wireless telecom switch. Features involve development based on integrated service digital oetwork protocols. Provide service nodes for telecom switches. Projects are designed exclusively usiog object-oriented methodologies & are implemented in C++ on UNIX & object-oriented database. Write UNIX shell scripts to improve test automation. Provide direction/support to lower level software engineers. Assess & document customer requirements of ISP system. Min reqs: MS in Computer Science and either 2 years experience carrying out those duties set forth in the job offered or 2 years experience in software development in the telecommunication industry & in programming in the UNIX workstation environment (to include therein 1 year in object-oriented design & C++ coding & 1/2 year in designing & programming with database & integrated service digital networks) - OR - BS in Computer Science and 5 years experience carrying out the above mentioned duties. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701. JO#TX0241684. Ad Paid by an Equal Opportunity Employer.

Systems Analyst: Jackson, MS. Provide project leadership & technical expertise, coding & testing, during system development, maintenance & productioo process. Analyze & design solutioos to complex technical problems with departmental staff & vendors. Recommend solotions to technical issues related to database design & development of life cycle methodologies to meet business objectives. Environment used is RPG/400, CLP, SQL oo AS/400. Bachelor's Degree or equivalent in Computer Science or related field & 2 yrs exp. in a systems analysis, programming or software engineering capacity OR 4 yrs exp. in a systems analysis, programming or software engineering capacity (i.e. no Degree). 40 hrs per wk. $55,000 per yr. Job Order #MS2832964. —— 2 Openings: Programmer Analyst: Jackson, MS. Perform analysis, coding, unit & systems testing & debugging to develop solutions to business problems. Participate in developing & execution of integrated parallel systems tests. Research & provide fixes to production software or data related failures. Document flowcharts, program narratives, conversion & implementation plans & test results. Environment used: RPG/400, CLP, SQL, SDA, RLU, UIM, QUERY/400 on AS/400. Bachelor's Degree or equivalent in Computer Science or related field & 2 yrs exp. in a systems analysis, programming or software engineering capacity (i.e. oo Degree). 40 hrs per wk. $53,000 per yr. Job Order #MS2832977. Must have legal authority to work in the U.S. Resume to Mississippi State Employment Service, 5959 I-55 N Frontage Rd, Jackson, MS 39213. Reference job order oumber.

Take a look at the career potential at two of the HOTTEST Career Fairs.....

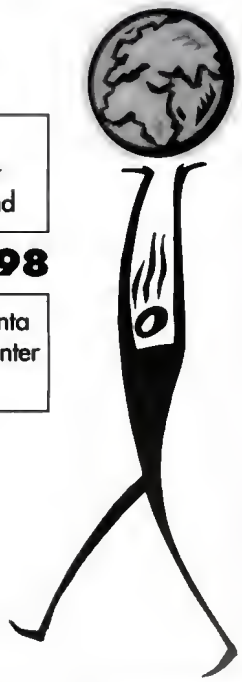
COMNET San Francisco

Where: ComNet San Francisco'98
Moscone Convention Center
When: September 30th-October 2nd

NETWORLD+INTEROP 98

Where: NetWorld+Interop '98, Atlanta
Georgia World Congress Center
When: October 21st-23rd

NetworkWorld
CAREER FAIR
at
NETWORLD INTEROP



For more information Talk to Network World 800-622-1108 ext 7510 ccapp@nww.com

INFORMATION TECHNOLOGY • KAISER PERMANENTE • www.kp.org/jobs

Advancing technology to improve health care.

That's the edge you give our team. And their patients.

Over 9,000,000 members across the country turn to Kaiser Permanente's more than 90,000 physicians, nurses, allied health and business professionals for expertise in managing their health care needs. Over 3,000 experienced Kaiser Permanente IT professionals utilize state-of-the-art technologies to facilitate the efficient delivery of this high quality care.

Using the latest tools on an unparalleled spectrum of applications, while enjoying the advantages of ongoing training and education, our IT professionals support clinical innovation, elevate member satisfaction and maximize efficiencies. They are leading the next generation information age in health care.

Bring your expertise to Kaiser Permanente today in one of the following disciplines. Become involved in exciting initiatives such as Web development, extranet, intranet, enterprise data security solutions, network planning, client/server-based projects, network infrastructure, project management and technology planning.

PC LAN
Seeking field technicians, administrators, desktop support specialists, LAN consultants and analysts with expertise in NT, Novell, TCP/IP, Lotus Notes, MS Exchange/Messaging, e-mail, LAN and WAN.

NETWORKING
Seeking administrators, consultants, WAN engineers, network design analysts and security consultants with expertise in Unix, Cisco, hubs, routers, bridges, switches, fast Ethernet, token ring, frame relay, ATM, AVR and Telephony.

TELECOMMUNICATIONS
Seeking analysts, consultants, software technical specialists and project managers with expertise in Unix, Cisco, hubs, routers, bridges, switches, voice, data, IVR, CTI and ACD PBX.

DATA WAREHOUSING
Seeking experts in Data Modeling, Meta Data, Repository, Brownstone, Platinum and Prism.

APPLICATIONS DEVELOPMENT
Seeking programmer analysts, systems programmers, systems analysts, application developers and operations specialists with expertise in PowerBuilder, C++, C Visual Basic, Sybase, Oracle, Unix, IEF/Composer, COOL: GEN, PCS/ADS, ADS Plus, MUMPS, SAS, EDI, MQ, OBDC, OCC, Corba, COBOL, COBOL II, JCL, MVS, DB2, CICS, Model 204, IMS, Tandem, TAL, DEC/VAX/VMS, PeopleSoft and Tesseract.

SYSTEMS PROGRAMMING, SYSTEMS ADMINISTRATION
Seeking experts in Unix, AIX, Solaris, MVS, CICS, DB2, IMS, Model 204, VTAM/NCP/SNA, Automated Operations, Ops MVS, Tivoli, RedBrick, IEF, Changeman, K2000, VMS Cluster Mgmt, Sybase, Oracle, Storage Mgmt, Capacity Planning and Vantive.

DATABASE ADMINISTRATION
Seeking analysts, administrators and programmers with expertise in Model 204, DB2, Oracle/Sybase/SQL, IMS, databases and Access.

BUSINESS ANALYSIS/PROJECT MANAGEMENT
Seeking analysts, consultants and project managers to oversee MS Project with expertise in major project planning and implementation experience for IT projects.

WEB DEVELOPMENT
Developers, coordinators (content developers), administrators and Web designers with extraordinary skills in the following: HTML, Java/C++, GUIs, graphics applications and creative design.

SOFTWARE ENGINEERING, SYSTEMS ENGINEERING AND ARCHITECTURE
Seeking expertise in emerging technologies, object-oriented, Visual Basic C++ and Oracle.

DATA SECURITY
Seeking experts in mainframe, mini, micro, Internet, intranet and extranet technologies including extensive knowledge of RACF, ACF2 and Firewalls.

TECH WRITING/INSTRUCTIONAL DESIGN
Seeking experts in AutoCad, Adobe Illustrator, HTML and PowerPoint.

INFORMATION TECHNOLOGY FINANCE
Seeking financial analysts, consultants and managers with MBAs.

Find out more about Kaiser Permanente Information Technology by visiting www.kp.org/jobs. Submit your resume, preferably by e-mail to: kpitjobs@kp.org, or fax to: 1-800-365-0993. The tangible and intangible benefits of working for an organization of our size and scope will change your career perspective in a healthy way. Affirmative Action/Equal Opportunity Employer.

KAISER PERMANENTE®

Affordable 10/100/1000Mbps

10/100 Network Cards

Gigabit Network Adapter ..... **Call for Prices**

3COM Fast EtherLink XL
Auto-sensing 10/100 PCI RJ45 network adapter .
(3C905-TX) ..... **Call for Prices**

iNTEL PRO/100 TX PCI
High performance 10/100 32 bit, RJ45, adapter.
(PILA8460). ..... **Call for Prices**

Hubs

3COM SuperStack II Hub 500
Dual speed auto-sensing 10/100 hub.
12-Port (3C16610) ..... **Call for Prices**
24-Port (3C16611). ..... **Call for Prices**

BAY NETWORKS
BayStack 100BASE-TX RJ45 stackable Hub
12-Port (AT2202001) **$1,150**
24-Port (AT2202003) **$1,200**

D-LINK 10/100 Hubs
10/100Base-TX Dual Speed Unmanaged Hub
16-Port (DFE-916X) Dual Speed. **$730**
24-Port (DFE-2624X) Dual Speed. **$970**

NBASE MegaStack 100 - Fast Ethernet Hub
24 10/100 Port autosensing stackable hub
with option for fiber uplink (NH1026) **$1,556**

Switches

3COM SuperStack II Switch 3300
Switched 10/100Mbps RJ45 ports
12-port (3C18981) 24-port (3C16980) .**Call for Prices**

3COM SuperStack II Switch 1100
The Switch 1100 provides 12-24 switched Ethernet ports and 2 10/100 ports. (3C16950/1) ..... **Call for Prices**

BAY NETWORKS BayStack 28115R/ADV LattisSwitch
A Fast Ethernet Switch with 16 RJ-45 ports for supporting 10/100Mbps. (28115R) **$7,459**

BAY NETWORKS 303/304 Switch
12-24 10BaseT ports and one 100TX port.
12-Port (AL2001E05) **$850**
24-Port (AL2001E04) **$1,120**

BAY NETWORKS BayStack 350T
16 10/100 auto-sensing ports.
(AL2012E01) ..... **Call for Prices**

BAY NETWORKS BayStack 350T-HD
24 10/100 AutoSence Switch
(AL2012E10) ..... **Call for Prices**

BAY NETWORKS Accelar 1250
4 slot chassis switch (DJ1402002). **$1,220**

Cisco Catalyst 1924
24 port 10Base-T switch with 2 100Base-TX port.
(WS-C1924-A) **$1,140**

Cisco Catalyst 2924
24 port 10/100 (WS-C2924XL) **$2,320**

NBase MegaSwitch II 10/100/1000
The only 10/100 auto-sensing switch with 8-ports and 2-slots to offer Fiber up to 110Km, ATM, and Gigabit Ethernet – All in one box. (NH2012) **$2,900**
Gigabit Ethernet Module (NH2002/GE/M) **$2,495**

NBASE MegaSwitch 228 (24+2+2)
24 10Base-T Ports, 2 auto-sensing 10/100 ports, and slot for 2 optional 100Base-TX/FX uplinks.
(NH228-10) **$2,330**

NBASE MegaSwitch
16-port 10/100 auto-sensing switch (NH2016) . . . **$2,799**

NBASE MegaSwitch
16-port 10/100 auto-sensing (UTP)and 4 slots for optional uplinks to upgrade to 32-port, SNMP
(NH2032) **$4,479**

NBASE MegaSwitch
8-port 10Base-T and 2-port 10/100
(NH210) **$780**

Remote Access

ADTRAN T1/FT1
TSU LT V.35, CSU/DSU. (1202060L1) **$659**

ASCEND Pipeline 85
Pipeline 85 ISDN Bridge Router with 2 Pots and 4 RJ45 ports (P85-1BRI) **$725**

ASCEND Pipeline 130
Pipeline 130 Router ISDN BRI, Built-in NT1, IP/IPX
(P130-UBRI-V35) **$1,276**

3Com/USR Access Concentrator 3000
Supports Full T1 and Handles 24 to 144 Modems
(001843-00) **$5,430**

CISCO 2501 Router
1 Ether port/2 serial ports
(Cisco2501-CH) ..... **Call for Prices**

CISCO 2509 Router
1 Ether port/2 serial ports/8 Asynchronous ports.
(Cisco2509- CH) **$2,139**

Special Pricing for ISP's

Transceivers

100Base-TX to 100Base-FX Transceiver .**Call for Prices**

10Base-T to AUI/FL Transceiver ..... **Call for Prices**

BNC to RJ45 Transceiver ..... **Call for Prices**

Call for Current Pricing on Any Manufacturer's Products

1-800-FOR-LANS
1-800-367-5267
sales@west-hills.com

WEST HILLS LAN SYSTEMS

7949 Woodley Avenue, Van Nuys, CA 91406
Technical Support: 818-773-8171
Fax: 1-818-773-8932

Visa/MasterCard/Discover/American Express • Fast Delivery • Most Orders Ship The Same Day • Prices Subject To Change Without Notice

Reader Service No. 297

Fast, Proven and Effective I.T. Training!

ForeFront offers the fastest and easiest way to provide superior training for Information Technology (I.T.) professionals. Our Self-Study Courses are 100% computer-based training (CBT) on CD-ROM for flexibility unmatched by traditional training methods.

- **Provide Valuable Knowledge and Skills**
- **Boost Work Efficiency and Performance**
- **Self-Paced Format for Flexible Scheduling**
- **Interactive Hands-on Exercises**
- **One-on-One Training Consulting Available**

NEW! Cisco Certification...FAST!

The Cisco Self-Study Course from CBT Systems™ provides training for the installation and maintenance of Cisco routers. This course fulfills the ICRC, ITM and ACRC requirements for the Cisco Career Certifications program. **Cisco condeveloped and approved!**

MCSE Certification...FAST!

The ForeFront MCSE Self-Study Course™ fully prepares I.T. professionals for passing the MCSE exams. Provides the knowledge and skills necessary to plan, implement, maintain and support information systems using Windows NT and other Microsoft® Server products.

CNE Certification...FAST!

The ForeFront CNE Self-Study Course™ provides fast, effective and convenient training for the CNE exams. Includes the knowledge I.T. professionals need to pass the exams and gain the skills for maintaining an IntranetWare network.

A+ Certification...FAST!

The ForeFront A+ Certification Self-Study Course™ incorporates all the technical material, knowledge and interactive exercises needed to pass the A+ exams and excel in today's dynamic PC repair marketplace.

Call Today for Special Discount Pricing!

1-800-475-5831

(813) 724-8994 • FAX (813) 726-6922

FORCEFRONT™ DIRECT

A CBT Group Company

25400 U.S. Hwy. 19 N., #285, Clearwater, FL 33763

NASDAQ: CBTSY

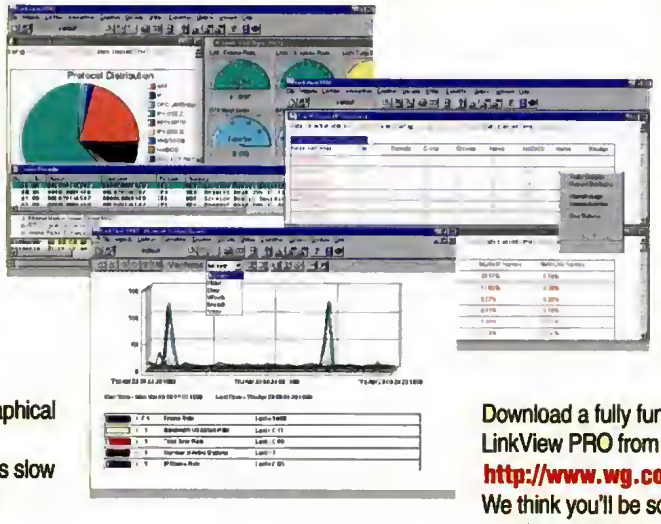
GSA# GS-02F-9379C

NWM

Reader Service No. 237

Are You Puzzled By Your Network Problems? Put the Pieces Together with LinkView PRO,™ A Software-Only 32-bit Network Analysis Application.

FREE LAN Analyzer Just For Trying LinkView PRO!



Take the guesswork out of analyzing your network with Wandel & Goltermann's LinkView PRO. LinkView's unique, powerful, and cost-effective analysis of Ethernet, Fast Ethernet, and Token Ring Networks lets you quickly and easily monitor, diagnose, troubleshoot, and understand your network. LinkView PRO is a real-time monitoring and analysis system that provides continuous network information down to a single node in networks of all sizes. Compatible with Windows 95 and Windows NT.

With LinkView PRO:

- See problem areas highlighted on a graphical map of your network
- Determine why and when the network is slow
- Decide when to segment your network
- Locate the top talker or sender
- Monitor critical network parameters
- Set alarms to detect both existing and potential problems
- View and decode protocol frames

Download a fully functional demo of LinkView PRO from our web site at **http://www.wg.com/linkviewfree.html**. We think you'll be so impressed with what you see that we'll give you a registered single-user copy of LinkView LAN Monitor **FREE**, just for trying our product (a $395 value). Limited time offer.

FREE!

Wandel & Goltermann
Communications Test Solutions

Reader Service No. 279

Break the Chains of Hardware Tyranny

LANtracer
Network Analyzer
$695

How about an instant intranet site that delivers live statistics about your network? LANtracer's software-only RMON probe collects comprehensive network data and serves it to any browser. This powerful and easy-to-use package pinpoints today's problems and prevents tomorrow's.

www.lantracer.com - download a copy today

Use any browser, anywhere to analyze your network!

- See your network's utilization, errors, packets, and broadcasts – on one screen – and 'drill down' for detailed reports and graphs
- Display a live network map, with color coding for vital top 'n' stats
- Analyze data with packet filter, capture, and decode
- Configure upper and lower thresholds and alarms or let LANtracer set them for you
- Analyze multiple Ethernet, Fast Ethernet, and Token Ring segments, remotely, from a single browser

(905) 238.0473
(905) 238.4976

proteon
LAN PRODUCTS BY MICROVITEC INC

Reader Service No. 224

REFURBISHED

Bay Networks SynOptics WELLFLEET communications

Largest Inventory of Refurbished Bay Networks in America!

- Bay Networks Trained
- Bay Networks Authorized
- Hundreds of pieces in stock
- New and Used Equipment
- Proven Track Record
- One Year Warranties
- Design and Install Services
- Technical Support

CABLETRON SYSTEMS The Complete Networking Solution™ 3Com IBM NOVELL

On-Sight Router Installation

WE REPAIR ALL BAY NETWORKS!

National LAN Exchange 888-891-4BAY (4 2 2 9)

1403 W. 820 N. Provo, UT 84601 FAX 801-377-0078 http://www.nle.com

C.O.D.'s • VISA • Mastercard • Discover • Terms

Circle Reader Service No. 231

Visit these Marketplace Advertisers Online!

1. Open Location: www.nwfusion.com/dc/marketplace.html
2. Scroll down to the advertiser you would like more information on.
3. Click on the advertiser's name to visit their web site.

Buy/Sell/Trade, New & Used

NETWORKING

Routers • Switches • Hubs

CISCO, BAYNETWORKS, CABLETRON

ASCEND FORE 3COM CHIPCOM

Visit Our WEBSITE@www.bizint.com

NY Office/Sales:
Tel: (315) 458-9606
Fax: (315) 458-9493

Main Office:
Tel: (978) 667-4926
Fax: (978) 663-0607

Circle Reader Service No. 219

Data Communications Specialist

ADC Kentrox	New - Refurbished
Adtran	Bridges
AT&T/Paradyne	Channel Banks
BAT Electronics	DSU/CSU's
Bay Networks	Hub/Switches
Cray/Datatel	Frame Relay
CISCO	ISDN
Codex	Modems
Micom	Multiplexers
Motorola	Routers
N.E.T	T-1/FT-1
Newbridge	Voice/Data
Paradyne	X.25
Racal Datacom	
UDS	

Information Data Products Corp.

1-800-362-3770

http://www.planet.net/idps

Quality Products • Competitive Prices • Immediate Deliveries
Pre and Post Sales Support

Circle Reader Service No. 273

SMC proteon Kalpana CHIPCOM SynOptics

1-800-AKA-ECOM

LAN/WAN NEW/USED

cabletron intel 3Com Bay Networks

NEW SPECIALS

3 Com HUBS & SWITCHES

USED

MUCH,MUCH MORE!!! PLEASE CALL!

ERGONOMIC ENTERPRISES INC.

47 WERMAN CT | PLAINVIEW NY | 11803

TEL: 516-293-2100 FAX: 516-293-2525

AUTHORIZED PRODUCT & SERVICE CENTER

WE TEST ALL PARTS BEFORE WE SHIP

We Accept: VISA ■ MASTERCARD ■ AMEX ■ C.O.D. ■ NET TERMS

Circle Reader Service No. 271

Livingston US Robotics
Ascend Micom

Specialist in all Cisco products including Memory

LAN/WAN Products

New, Used, Lease, Rent

3Com Codex
Adtran Xylogics
Motorola Wellfleet

We carry all Manufacturers

Millennium Solutions Group, Inc.

- Routers, Bridges
- Frame Relay
- DSU/CSU's
- Hubs, Modems
- Switches, ATM
- Voice over Data

We Buy and Sell
888-801-2001 Fax (916) 797-9997
Visit our Web Site at:
http://www.millenniumsolutions.net

Circle Reader Service No. 293

For More Information About Marketplace

1-800-622-1108

SOFTWARE AT WHOLESALE $$$$$

MICROSOFT NT-v4.0		NOVELL - INTRANETWARE	
Office Pro '97 SB	$158	Intra-SB 5 user	$395
Office Pro '97	$186	Intra SB- 10 user	$695
NT Server-5 Clients	$285	Intra/4.11-5 user	$595
NT Server-10 Clients	$565	Intra/4.11-10 user	$1295
NT Server-20 Lic/Pac	$295	Intra/4.11-25 user	$1985
NT Workstation	$125	Intra/4.11-50 user	$2995
Back Office-SB-110	$985	Intra/4.11-100 user	Call
Back Office-SB-25	$1385	Intra/4.11-250 user	Call

Novell Upgrades 40% Off
Microsoft Upgrades 40% Off, We Call for BEST Price!

Distributing: NOVELL - MICROSOFT - CISCO - 3COM NETWORKS INTEL Etc.

SAFE SYSTEMS INC.

Circle Reader Service No. 296

SNMP Tools

Multiple Agent Simulator

Develop, test, demonstrate Management applications without real devices.

Automated Agent Tester

Complete weeks worth of manual testing in minutes.

SIMPLESOFT Inc.
Tel: (650) 965-4515
Web: www.smplsft.com

Circle Reader Service No. 267

Coming Up in August

Issue Date		Close
August 3	Single Product Review on Instinctive eRoom.	July 22
August 17	Camparative Product Review an Netware 5	August 5
August 24	Comporotive Product Review on outhenticotion devices.	August 12
August 31	Comporotive Product on Internet site blocking softwore.	August 19

To reserve your ad space call 1-800-622-1108 ext. 7507

Please note that technology updates, and comparative and single product review dates and topics are subject to change without notice.

TRAINING DIRECTORY

CrossTec's NetOp School
(800) 675-0729
www.4ctc.com
FREE EVAL – Remote Control, Chat, Monitor or Demo to multiple PCs

Marcraft International
(800) 441-6006
www.mic-inc/Aplus.com
A+ Certification with Books, CD and over 500 test questions $165

Edutec Training Rooms
(212) 634-4288
www.hertztec.com
Modern rooms for LEASE in NYC 15-20 wkstn per. T1 lines..

NCR Customer Education
(800) 845-2273
www.ncr.com/trainus
Cisco, MCSE, NT & Networking, Training

Evernet Education Svcs
(800) 447-3658
www.Everneted.com
Authorized Microsoft MCSE and Novell CNS-CBT'SE also available

Pine Mountain Group
(800) 645-8486
www.pmg.com
Router, server, desktop, NT Troubleshooting. Multi-vendor.

ForeFront Direct
(800) 475-5831
www.ffg.com
Computer based training for the I.T. industry

Transcender Corporation
(615) 726-8779
www.transcender.com
MCSE, MCSD, MCP Exam Simulations

GeoTrain Corp.
1-800-COURSES
www.geotrain.com
Cisco-certified Internetworking classes and certifications-Now!

To Place Your Listing Here Call Enku Gubaie at 1-800-622-1108

For information on listing your service here, contact Enku Gubaie at 800-622-1108 x7465, egubaie@nww.com

NETWORK WORLD, INC.

THE MEADOWS, 161 WORCESTER ROAD, FRAMINGHAM, MA 01701-8172
(508) 875-8400/FAX: (508) 875-8931/TTD 1-800-441-7484

Colin Ungaro, President/CEO
Evilee Thibeault, Senior Vice President/Publisher
Mary Kaye Newton, Assistant to the President
Eleni Grisbois, Senior Sales Associate

ADMINISTRATION
Mary Fanning, Vice President Finance and Operations
Frank Coelho, Office Services Manager
Paul Mercer, Finance Manager
Lisa Smith, Telecommunications Administrator
Tom Garvey, Mailroom Supervisor
Tim DeMeo, Mailroom Assistant

HUMAN RESOURCES
Monica Brunaccini, Director of Human Resources
Danielle Volpe, Sr. Human Resources Representative

MARKETING
Kristin Wattu, Marketing Communications Manager
Barbara Sullivan, Marketing Research Analyst
Donna Kirkey, Marketing Design Manager
Melissa Bartlett, Marketing Specialist

GLOBAL PRODUCT SUPPORT CENTER
Joanne Wittren, Senior Global Marketing Services Manager
Cindy Panzera, Marketing Specialist

ADVERTISING OPERATIONS
Karen Lincoln, Director of Advertising Operations
Ann Jordan, Senior Advertising Account Coordinator
Cathy Sampson, Advertising Account Coordinator
Sandy Weill, Direct Response/Recruitment Ad Coordinator

PRODUCTION
Ann Finn, Production Director
Greg Morgan, Production Supervisor
Mario Matoska, Print Buying Supervisor

CIRCULATION
Sharon Smith, Senior Director of Circulation
Richard Priante, Director of Circulation
Gobbie Cruse, Assistant Circulation Director
Mary McIntire, Circulation Assistant

RESEARCH
Ann MacKay, Research Director

DISTRIBUTION
Bob Wescott, Distribution Manager/(508)879-0700

IDG LIST RENTAL SERVICES
Elizabeth Tyle, Sales Representative
P.O. Box 9151, Framingham, MA 01701-9151
(800) 343-6474/(508) 370-0825, FAX:(508) 370-0020

PROFESSIONAL DEVELOPMENT GROUP
William Reinstein, Senior V.P./ Business Development
Steven Engel, General Manager Seminars & Events
Debra Becker, Sr. Marketing Manager
Christie Sears, Finance/Operations Manager
William Bernardi, Senior Product Specialist
Peter Halliday, Product Manager/NetDraw
Andrea D'Amato, Sales Manager/Strategic Partnerships
Sharon Schawbel, Event Planner
Getty Amaro, Operations Specialist
Maureen Whiting, Marketing Specialist
Jennifer London, Sales Associate

ONLINE SERVICES
Ann Roskey, Director, Online Services
Jean-Oliver Holingue, Director of Technology
Clare O'Brien, Online Sales Manager
Dan Chupka, Online Account Executive
Pam Kerensky, Web Information Specialist
Andrea Dukuta, Web Producer Specialist
Jolene Springfield, Online Adv. Operations Specialist
FAX.(508) 270-8869

INFORMATION SYSTEMS/IMAGING SERVICES
Michael Draper, Vice President Information Systems
Jack McDonough, Director of Systems and Technologies
Rocco Bortona, Network Manager
Kevin D'Keefe, Desktop Services Manager
John Chambers, Groupware Technologist
Anne Nickinello, Digital Imaging Manager
Deboreh Vozikis, Senior Imaging Specialist
Sean Landry, Imaging Specialist

IDG

Patrick J. McGovern, Chairman of the Board **Kelly Conlin**, President **Jim Casella**, Chief Operating Officer

Network World is a publication of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 275 computer publications in 75 countries. Ninety million people read one or more IDG publications each month. *Network World* contributes to the IDG News Service, offering the latest on domestic and international computer news.

SALES OFFICES

Carol Lasker, Associate Publisher
Internet: clasker@nww.com
Debbie Lovell, Senior Sales Associate
(508) 875-6400/FAX:(508)879-5760

NEW YORK/NEW JERSEY
Tom Davis, Advertising Director/Eastern Region
Elisa Scheuermann, District Manager
Internet: tdavis, elisas@nww.com
Aimee Jacobs, Sales Assistant
(201) 587-0090/FAX: (201) 712-9786

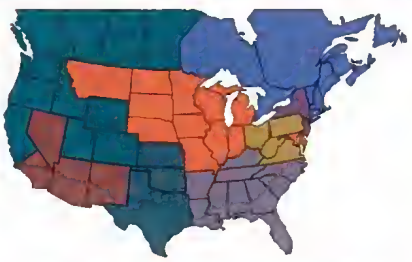
NORTHEAST
Donna Pomponi, Senior District Manager
Kevin Casper, District Manager
Michael Eadie, Account Executive
Internet: dpomponi, kgasper, meadie@nww.com
Wendy Cailleo, Sales Assistant
(508) 875-6400/FAX.(508) 879-5760

MID-ATLANTIC
Jacqui DiBianca, Senior District Manager
James Kalbach, Account Executive
Internet: jdibian, jkalbach@nww.com
Barbara Stewart, Sales Assistant
(610) 971-1530/FAX: (610) 975-0837

MIDWEST/MARYLAND
Rick Groves, Senior District Manager
Internet: rgroves@nww.com
Barbara Stewart, Sales Assistant
(610) 341-6025/FAX: (610) 975-0837

CENTRAL
Dan Gentile, Midwest Regional Manager
Internet: dgentile@nww.com
Kristin Ashton, Sales Assistant
(512) 249-2200/FAX: (512) 249-2202

NORTHWEST
Sandra Kupiec, Advertising Director/Western Region
Susan Rastellini, District Manager
Carol Stiglic, District Manager
Lisa Bennion, District Manager
Internet: skupiec, slr, cstiglic, lbennion@nww.com
Shannon Dempsey, Sales Operations Manager
Milione Mendezona, Sales Assistant
Mark Hiatt, Sales Assistant
Jim Fox, Sales Assistant
(408) 587-4150/FAX: (408) 567-4166



SOUTHWEST
Amy C. Bartulis, Senior District Manager
Internet: abartuli@nww.com
Becky Bogart, Account Executive
(714) 250-3006/FAX: (714) 833-2857

SOUTHEAST
Don Seay, Senior District Manager
Internet: dseay@nww.com
Terry Sanders-Prentice, Sales Assistant
(770) 394-0758/FAX: (770) 394-6354

DIRECT RESPONSE ADVERTISING
Response Card Decks/Marketplace
Joan M. Bayon, Director Direct Response Advertising
Richard Black, Sr. Account Manager
Enku Gubaie, Account Executive
Sean Weglage, Account Manager
Kate Berlandi, Account Manager
Internet: jbayon, rblack, egubaie, sweglage, kberlandi@nww.com
Sharon Chin, Sales/Marketing Operations Manager
Chris Gibney, Sales Assistant
(508) 875-6400/FAX: (508) 628-3976

RECRUITMENT ADVERTISING
Dodi Rabinovitz, Senior Recruitment Director
Carla Cappucci, Sales Associate Central U.S Territory
James Parker, Account Executive
Karma Zannotti, Account Executive
Internet:drabinov,ccapp,jparker,kzannotti@nww.com
(508) 875-6400/FAX: (508) 820-0607

EDITORIAL INDEX

3Com 14
A
ADVA Optical Solutions 28
Aiteon Networks 43
Ameritech 6
Ascend 27
AT&T 29
B
Berkeley Networks 43
Bow Street Software 31
BT 1
C
Cabletron 19
Cisco 6,27
Compaq 22
D
Digital 14,22
Documentum 31
E
Extreme Networks 1
H
Harmony Software 31
Hewlett-Packard 19
I
IBM 6,14,27
L
Level 3 Communications 29
Lotus 12,31
Lucent 27
M
MCI 14
Memotec Communications 28
Microsoft 1,6,8,24
N
Netscape 1,6
Nortel 15,27
Novell 19,24
O
Oracle 6
P
Packet Engines 1,60
Plaintree 19
Plumtree Software 62
PointCast 62
Q
Qwest 29
R
RAScom 22
Resonate 62
S
SAP 6
Siemens 6
Softcom Microsystems 28
Sprint 27,31
Sun 6,8,19
W
WorldCom 29
X
Xylan 6

ADVERTISER INDEX

Advertiser	Reader Service#	Page#	URL
3Com		10-11	www.3com.com
ACI International	245	52	www.aciconnect.com
Adtran		9	www.adtran.com
Am Tech Labs Inc	302	50	www.atli.com
American Power Conversion		25	www.apcc.com
Bay Tech	262	55	www.baytechdcd.com
Castle Rock Computing	300 252	48, 52	www.castlerock.com
Citrix		63	www.thinergy.com
Compaq Computer Corp		32-33	www.compaq.com
Compatible Systems Corp	238	53	www.compatible.com
Computer Associates		20-21	www.cai.com
Cybex Computer Products	227	48	www.cybex.com
FlowWise Networks Inc		64	www.flowwise.com
FormFront Direct Inc	237	51	www.ffg.com
Global Technology Associates	292	50	www.gnatbox.com
Hewlett Packard		7	www.hp.com
HyNEX Ltd	299	52	www.hynex.com
Lotus Development Co		2-3	www.lotus.com
Managing Enterprise Networks		41	www.dci.com
Metrocom	220	54	www.metrocominc.com
Microsoft Corp		16-17	www.microsoft.com
NetNation Communications	278	50	www.netnation.com
Network Instruments	290	51	www.networkinstruments.com
Nortel		13	www.nortel.com
Packet Engines		18	www.packetengines.com
Precision Guesswork	254	50	www.guesswork.com
Proteon Inc	224 223	54, 56	www.lantracer.com
RadioLAN Inc	15		www.radiolan.com
Raritan Computer	314	55	www.raritan.com
Rose Electronics	289	53	www.rosel.com
SDL Comm Inc	277	54	www.sdlcomm.com
Sun Microsystems Inc	4, 23		www.sun.com
Transcender	222	55	www.transcender.com
US West		38	www.uswest.com
Vir Inc	281	52	www.virinc.com
Visual Networks Inc		26	www.visualnetworks.com
Wandel & Goltermann	279	49	www.wg.com
West Hills LAN Systems	297	49	www.west-hills.com

Network World Fusion - www.nwfusion.com

3Com (2)	Dialogic	Netscape
ACC	Digital	Netscout
Anixter	ExecuTrain	Nortel
Ariel	IBM (3)	Novell (2)
Asante	Information Builders	Philips
Ascend	Intel (2)	Sun Microsystems
Arrowpoint	Kodak	SyncSort
Attachmate	Make Systems	Unisys
Bay Networks (1)	Microsoft (5)	UUNET
Cisco (2)	Milkyway	VeriSign
Citrix		

These indexes are provided as a reader service. Although every effort has been made to make them as complete as possible, the publication does not assume liability for errors or omissions.

*Indicates Regional/Demographic

DIRECTORY OF SERVICES

NSA

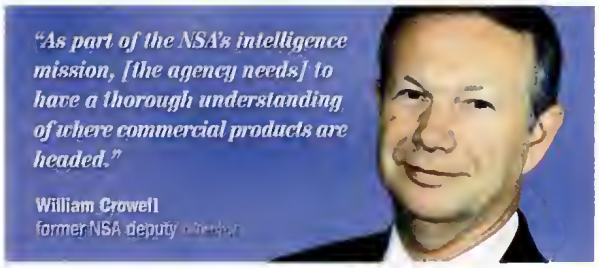
Continued from page 1

tap into the data. And because practically every commercial network application, router or switch these days includes encryption or an option for it, almost every vendor now has to answer to the NSA if it wants to export.

Hot line to the NSA

It's gotten to the point where no vendor hip to the NSA's power will even start building products without checking in with Fort Meade first. This includes even that supposed ruler of the software universe, Microsoft Corp. "It's inevitable that you design products with specific [encryption] algorithms and key lengths in mind," said Ira Rubenstein, Microsoft attorney and a top lieutenant to Bill Gates. By his own account, Rubenstein acts as a "filter" between the NSA and Microsoft's design teams in Redmond, Wash. "Any time that you're developing a new product, you will be working closely with the NSA," he noted.

When it comes to encryption, it's widely known that a 40-bit encryption key is easily breakable and hence rather useless. Until not long ago, this is what the U.S. government allowed for the export of software.



But the Clinton administration a year and a half ago said it would allow the export of products with stronger encryption keys by any vendor that agreed to add a "key-recovery" feature to its products by year-end — giving the government access to encrypted data without the end user's knowledge.

According to Bill Reinsche, Department of Commerce undersecretary for the Bureau of Export Controls, about 50 vendors have submitted plans for government-approved key-recovery, also called data-recovery. These companies, which include IBM, were rewarded with Key Management Infrastructure (KMI) export licenses to export products with 56-bit or stronger encryption until year-end.

But some companies are discovering that dealing with the Commerce Department for a KMI license means more involvement with the NSA.

The Bureau of Export Control is actually just a front for the NSA, said Alison Giacomelli, director of export compliance at VPNet Technologies, Inc., a San Jose, Calif.-based vendor of IP-based encryption gateways. "The NSA has sign-off authority on these KMI licenses," Giacomelli said. In return for the KMI license, VPNet opened itself up for an NSA audit.

"They've already come out once, and they'll be coming out again," Giacomelli said. VPNet remains committed to meeting the deadline for adding key-recovery to its product but has one major problem: uncertainty about what the NSA really wants. The confusion means "there's a lot of risk . . . in terms of engineering and resources," Giacomelli said.

Clearly wary of granting the government supervision over its products, Microsoft has stubbornly refused to submit a data-recovery plan, even though the Redmond giant already includes a data-recovery feature in its Exchange Server.

"The Exchange Server can only be used when this feature is present," Rubenstein said. "Because we haven't filed a product plan, it's harder for us to export this than for companies that have filed plans."

But in an odd-couple sort of joint-partner arrangement, Microsoft and the NSA did work together to build what's called Server Gated Cryptography. Primarily intended to help banks use Web servers to do business internationally, the technology lets a server with a special digital certificate provide 128-bit encryption support to a Web browser outside the U.S.

Sybase, Inc., which also submitted a plan to add key-recovery to its products, found it hard to satisfy the government's demands. "They approved our technological approach but disapproved each of our applications with it," said Sybase President and CEO Mitchell Kertzman. "It's been frustrating."

Documents recently obtained under the Freedom of Information Act (FOIA) by the Washington, D.C.-based Electronic Privacy Information Center contain the data-recovery plan Netscape filed at the Commerce Department last year.

Netscape's plan explains that the "escrow of private encryption keys" could be achieved by developing client and server products that can only issue an X.509 digital certificate after the private key has been escrowed. The key can only be held by an entity chosen by the intranet administrator who handles security policy.

The Netscape plan called for introducing a certificate server with recovery capabilities in the first quarter of this year, with the introduction of S/MIME clients with basic recovery features in the second quarter.

Netscape hasn't actually carried out this plan, and the company declined to discuss it. Netscape attorney Peter Harter would only say officially, "We had no choice but to submit the plan, no matter how much we opposed key-escrow, in order to be part of the ongoing dialog."

Other FOIA documents show that Netscape was regularly briefing the NSA on its product plans since 1996 and that then NSA Deputy Director William Crowell took a special interest in trying to dissuade Netscape from using strong encryption.

Crowell, now vice president for product marketing and strategy at Cylink Corp., said he had frequent discussions with Netscape, especially concerning changes to Netscape Navigator.

"Their product didn't have a separate signature key, so if the government used the product for key-escrow later, you'd have to store the signature key with a third party, which we thought was a bad idea," Crowell said. He added that Netscape Navigator 3.0 adopted the changes the NSA wanted.

According to Crowell, the NSA has a great deal of expertise in securing communications, and it wants to ensure that products bought by the Defense Department meet NSA standards. "In addition, as part of the NSA's intelligence mission, [the agency needs] to have a thorough understanding of where commercial products are headed."

Taher Elgamal, author of the Netscape data-recovery plan, who recently left Netscape to start his own venture, said Netscape had no choice but to maintain constant contact with the NSA.

"They're costing the industry a lot of money," Elgamal said.

Others agree. "Everyone in Silicon Valley, including us, has to have specific staff — highly paid experts — to deal with them," said Chris Tolles, security group product manager at Sun. "Their job is to wrangle this from a policy standpoint."

Sun has had run-ins with the NSA in the past. Two years ago, the NSA objected to Sun including encryption in the exportable version of Java 1.1. The end result was that Sun stripped encryption out of Java 1.1 and the software was delayed by about six months. ■

PROFILE: THE NATIONAL SECURITY AGENCY

Headquarters: Fort Meade, Md.

Director: Lt. General Kenneth Minihan

Established: 1952

Mission as stated on NSA Web site: centralized coordination of highly specialized technical functions in support of U.S. government activities to protect U.S. communications and produce foreign intelligence information.

Secret budget: an estimated $15 billion annually

Employees: estimated at 40,000

Fun fact: The NSA is one the largest employers of mathematicians in the United States.

DOJ approves WorldCom/MCI, MCI sells Internet business

By Denise Pappalardo

As expected, the U.S. Department of Justice approved the $37 billion WorldCom, Inc. and MCI Communications Corp. merger last week. Following the announcement, MCI said it would sell its Internet business to British telecommunications company Cable & Wireless PLC for $1.75 billion in cash (*NW*, July 13, page 16).

Trustbusters at the Department of Justice and the European Competition Commission were concerned that MCI and WorldCom's combined Internet assets would have given the merged company too dominant of a position in the Internet services realm, and they forced MCI to sell off its Internet business.

The deal brings Cable & Wireless MCI's 1,300 wholesale ISP customers, more than 250,000 residential dial-up customers and more than 2,000 dedicated business Internet access customers. The deal also gives Cable & Wireless MCI's entire backbone network, which includes more than 300 point-of-presence sites and 1,000 MCI employees. The pact catapults Cable & Wireless from a virtually unknown Internet player to one of the top five ISPs in the world.

In order to give Cable & Wireless adequate time to get its competitive feet wet, MCI has committed to noncompete agreements. For example, MCI will not be allowed to sell services to former wholesale customers for the next two years, nor will the company be permitted to sell any services to its dedicated Internet access customers for the next 18 months.

While it's unlikely that anything could thwart final approval from the Federal Communications Commission, it's not yet a done deal. Observers said the FCC should grant approval next month. ■

Gigabit Ethernet: manning the MAN

School system uses Packet Engine's gigabit gear to link its many locations.

By Robin Schreier Hohman

When Dick Hol began pushing for an educational metropolitan-area network — or E-MAN — a little over a year ago, the district director of information systems for the community college of Spokane wasn't thinking about Gigabit Ethernet.

E-MAN was conceived as a broadband, multimedia network designed to link 13 educational institutions from K-12 school districts to community colleges and public universities in Spokane, Wash.

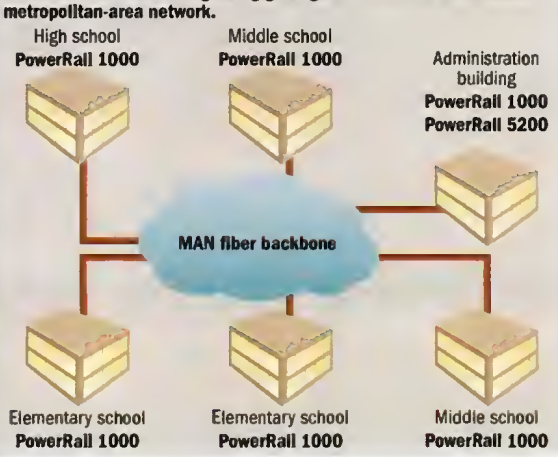
"A year ago, we thought ATM was the only solution," Hol said. That belief probably originated because integrated voice capability was part of the requirement to link the school system.

So when Hol and officials from the 12 other agencies in the city's educational system put together a formal call for proposals, they were surprised that Gigabit Ethernet vendor Packet Engines, Inc. responded.

Packet Engines, which began life in the Bay area and moved to Spokane in 1994, doesn't do much ATM, and the five other bids the school received were all from companies pitching ATM solutions.

GIGABIT ETHERNET IS THE MAN

Schools install Packet Engine's gigabit gear to drive an educational metropolitan-area network.



"We were all fairly skeptical," about Gigabit Ethernet in a metropolitan-area network, said Dennis Schweikhardt, manager of technology infrastructure for Spokane School District 81.

Skeptical, that is, until Brian MacLeod, Packet Engine's director of marketing, proved that Gigabit Ethernet could handle tasks the educational executives thought only ATM could do.

For example, MacLeod oversubscribed a IG bit/sec pipe by a factor of three and then, by applying quality-of-service capabilities, showed Gigabit Ethernet could still support "crystal-clear video." MacLeod also demonstrated IP multicast with video and video on demand.

But perhaps the most impressive thing was that, using a Netrix Corp. voice-over-IP gateway hooked up to Packet Engine's switches, the administrators could make calls across the data network.

The demo helped swing the unusual Gigabit Ethernet WAN deal for Packet Engines. "The cost of ATM and Gigabit Ethernet was somewhat comparable," claimed Hol. But Hol said the schools felt Gigabit Ethernet would be more manageable because technical staffers were familiar with it.

In April, the school district awarded the E-MAN contract to Packet Engines and Washington Water Power Fiber (WWP), a local power company subsidiary that will provide dark fiber to link buildings.

For Packet Engines, the deal means about $1.7 million in revenue; the rest of the $10 million allocated for phase one of the E-MAN project will go to WWP for the installation of the single-mode fiber.

Each location on the E-MAN will have one Packet Engines PowerRail 1000 Routing Switch and one Netrix box.

The PowerRail 1000 is a stackable Layer 3 switch with a throughput of nearly 6 million packet/sec for IPv4, IPv6 and IPX traffic. It has 20 autosensing 10/100M bit/sec Ethernet ports and two Gigabit Ethernet ports.

For redundancy, the consortium is building five fiber rings, supporting from eight to 12 locations on each ring. Each location will have two connections to the network.

The central administration building for District 81 will be outfitted with a PowerRail 5200, a chassis-based Layer 3 switch with a throughput of almost 37 million packet/sec.

The 5200 can support up to 25 Gigabit Ethernet ports. The administration building will also have eight Netrix boxes. The Netrix Network Exchange 2210 sits between the Packet Engines switch and the PBX, converting voice signals into packets so that they can be switched across the data network.

"We're using the IP [Type of Service] indicator to give the voice traffic priority over data applications in this network," said Steve Byars, chief technology officer at Netrix. The Type of Service field, which resides in the IP header, allows applications to identify higher-priority traffic to routing switches.

E-MAN will improve Internet access, cut telephony costs and support a video-on-demand capability that enables educators to pull down video training materials as they need them, which means no more checking movies out of the A/V room.

The network will also enable schools to participate in multicast presentations of lectures and other programs. But Schweikhardt said the school district is hoping the project leads to something even more important: turning out tech-savvy kids. By using the Internet and relying more on computers, students will learn how to think in new ways.

Further down the road, he hopes the E-MAN will be expanded to provide the infrastructure to attract high-tech and manufacturing companies to the region.

"This network is fundamentally a revolution that will enable us to do things that we cannot do today. The impact is going to be felt for years, in ways that I can't even predict," Schweikhardt said.

"Gigabit Ethernet troops just moved into the trenches. This authenticates Gigabit Ethernet as a candidate for metropolitan-area network applications," said Steve Bell, president and CEO of The Silicon Valley Networking Lab, a new network equipment test center in Palo Alto. ■

DON HAMILTON PHOTOGRAPHY

"This network is fundamentally a revolution that will enable us to do things that we cannot do today. The impact is going to be felt for years, in ways that I can't even predict."

Dennis Schweikhardt,
Manager of technology infrastructure for Spokane School District 81

Gigabit

Continued from page 1

trical utility and network gear from Packet Engines, Inc. (see story, above). The project illustrates a compelling new application for the technology: Customers could build high-speed, multimedia Ethernet WANs that cost less and provide greater bandwidth than today's inflexible T-1 or T-3 networks.

For vendors of ATM products, the Washington state deal also serves as a warning that Gigabit Ethernet companies such as Packet Engines and Extreme Networks, Inc. aren't content to remain LAN-locked.

According to Bernard Daines, president of Packet Engines, wide-area Gigabit Ethernets are the result of three different forces: the availability of low-cost, wire-speed routing devices; the industry's convergence on IP; and the availability of dark fiber and alternate long-distance channels.

"That allows people to think of networking in a very different way," Daines said. "They can consider their whole operation as an extended LAN, rather than having to go to some carrier that carries bits at a lower rate in between LANs."

Packet Engines, based in Spokane, Wash., is already building the Washington state network — called E-MAN — and another network like it, and claims to have several more projects waiting in the wings. Extreme, of Cupertino, Calif., is involved with a trial in Great Britain in which telecom giant British Telecommunications plc (BT) is evaluating a multimedia service based on Gigabit Ethernet.

But don't get too excited. Even supporters said Gigabit Ethernet metropolitan-area networks and WANs are concepts in their infancy, and the E-MAN and BT projects are on the bleeding edge of technology.

Esmeralda Silva, LAN analyst at International Data Corp. in Framingham, Mass., said she isn't expecting a big boom in Gigabit Ethernet metropolitan-area networks or WANs any time soon. "ATM is still really the technology for larger accounts that are looking for something that reaches out into the wide area."

The key reason: quality of service. Gigabit Ethernet cannot provide the same levels of voice and video quality that ATM can, and nobody expects that it will, Silva said.

Daines disagreed. He said Gigabit Ethernet not only provides enough capacity to overcome many quality-of-service

IBM

Continued from page 1

network applications to help search for, manage and access widely distributed corporate data. Both efforts have met with tepid third-party and industry support.

The new adapters, dubbed System Management Processors, are built on modified PowerPC 403x chips already in use in newer IBM RS/6000 and Netfinity 5500 PC servers. IBM said it will boost the chip's management capabilities and performance to let the chip better manage servers and handle communications devices.

The 403x has a number of potential network uses, said Dean Parker, a product manager for PowerPC embedded processors at IBM. "It can monitor and control Direct Memory Access [DMA] to handle data flow in a system. The chip will have a serial port controller so it can communicate directly with an external device — all things that are useful for networking," he said. "There are other chips with integrated functions, but this particular mix is unique."

The user acid test

At Health First, a health care system provider in Melbourne, Fla., users who have been testing Systems Management Processors in Netfinity servers. Because of the chip's remote management capabilities, Health First has been able to triple its servers without adding more IT staff.

"We are a [24-7] shop, and we have medical patients. If a system goes down, it has to be back up as quickly as possible," said Mark Amey, director of technical services. The product also allows managers to dial in to the servers remotely from home and restart them, Amey said.

"It's cut down on unexpected downtime and scheduled downtime," he said. The chip can also page a network administrator directly, as well as alert staff using Netfinity's Management console.

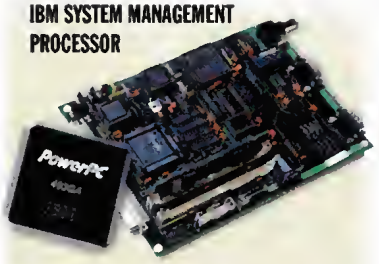
IBM claims the chip has intelligence that lets it monitor disks, memory, processors, fans and power supplies in an effort to identify problems before they bring a system down. The chip works independently of a device's operating system, so that in the event of an operating system failure, the chip can still function and alert staff. This is unlike software-based management tools, which fail when the operating system crashes.

The chip can also provide a fuller picture of a box's health than is currently available from software management packages, IBM said.

The Netfinity server has a variety of functions that the chip handles automatically, IBM said. If, for instance, a PCI card is getting too hot, the server can turn a fan on to cool it down.

The server can notify IS managers when it is about to crash, and it can also shut down and reboot the system. If a component needs to be replaced or repaired, the chip will activate the LED lights to indicate the troubled area, for easier service.

IBM SYSTEM MANAGEMENT PROCESSOR



- The chip, embedded in new adapters, monitors and controls the temperature, voltage and operating system of a device.
- The processor can be accessed remotely via a browser or modem.
- The processor is DMI and SNMP compliant.
- The chip can reboot or shut down a device if necessary.

NHD's role

Sources at IBM's Networking Hardware Division (NHD) said the System Management Processor could be incorporated in high-end routers and switches — such as the 2216 and 3746 front-end processors. Users may be able to upgrade existing hardware to work with the chip via blade or backplane upgrades.

Sources at NHD also said their version of the chip would contain a Java Virtual Machine so that if a problem arose, the JVM would immediately launch a Java applet to notify staff. The applet would be able to tell the IS staff just what the problem was, therefore eliminating the need to shut down a piece of equipment and laboriously examine it.

The chip can pinpoint the failure of a specific port or blade; it can also enable and disable ports and blades and then reboot the whole system.

Standards compliance

The System Management Processor is Desktop Management Interface (DMI) compliant. DMI specifies a standard way for sending management information from remote devices across the network to a central site. DMI systems also let managers define and filter events, such as alarms, sent out by the managed PC servers, communications gear and software.

The processor will also be able to report management data via SNMP to enterprise management packages such as IBM/Tivoli Inc.'s TME 10 or Hewlett-Packard Co.'s OpenView.

DMI compliance means IBM could share System Management Processor information with other DMI products from vendors such as Compaq Computer Corp., Dell Computer Corp., Digital Equipment Corp., Intel Corp., Microsoft Corp., NEC Corp., Novell, Inc., The Santa Cruz Operation, Inc., Symantec Corp. and SunSoft, Inc.

One smart chip

"The chip knows more of what is going on [inside the device] than the operating system does," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy located in Washington, D.C.

The more complex a system gets, the more monitoring tools such as this chip are necessary to make it run properly. "This is the kind of stuff you see on spacecraft," Dzubeck said. ■

(QoS) issues, but vendors are building new features — from queuing mechanisms, traffic prioritization schemes and management functions — into their devices that can ensure QoS. He added that the E-MAN project will prove Gigabit Ethernet can provide adequate QoS for voice and video applications.

"The schools recognized this a while ago," Daines said. "Everybody else bid ATM; we bid Gigabit Ethernet and were selected for a fairly large operation. People are finding that there really isn't much advantage that ATM offers, and ATM is more expensive."

BT is also discovering that Gigabit Ethernet can deliver QoS. The carrier is using Extreme switches in the backbone and at the edge of a campus testbed network of 1,000 users. The carrier is running Cisco Systems, Inc.'s IP TV software to enable those users to participate in audio and video conferences.

"It all works like it's supposed to," said Mark Salter, network systems engineer at BT. "I've saturated a gigabit link and tried to put a video stream through it with and without quality of service. Without QoS, you don't get anything; with QoS, it works."

The major limitation to Gigabit Ethernet in the metropolitan-area network and WAN is distance. Users can run Gigabit Ethernet frames and packets up to 100 kilometers without repeaters, but it's unlikely that the technology can run around the globe natively, Daines said.

"We're not going to get 3,000 miles in one hop," he said.

How carriers and service providers perform amplification, repeating and passing of packets from point-to-point will help determine how far Gigabit Ethernet can go in the metropolitan-area network and WAN.

Daines said he believes that the existing packet-over Synchronous Optical Network (SONET) infrastructure and services will go a long way in extending Gigabit Ethernet over great distances.

Another factor in determining Gigabit Ethernet's feasibility in metropolitan-area networks and WANs is access to dark fiber, a term that refers to fiber cable that is leased without switches, optical transceivers or services. Today, private fiber facilities are scarce.

Indeed, some observers say the E-MAN project is a better example of a dark fiber application than it is a proof of concept for Gigabit Ethernet in the metropolitan-area network.

"If you can get access to dark fiber at a reasonable price, and if you're within the distance limits, then the economics are wonderful," said Ron Jeffries, president of Jeffries Research in Arroyo Grande, Calif. "But does it ever make sense if there's no dark fiber? I don't think it does today."

Without dark fiber, users would have to rely on a service provider offering some kind of native Gigabit Ethernet service. That's not a big topic of discussion today, but if there's enough risk to the current T-1 and T-3 business, carriers may see more of an incentive to offer the high-speed LAN technology in metropolitan-area networks and WANs.

Until then, E-MAN pioneers will be creating the business case for both Gigabit Ethernet WANs and dark fiber.

"People can build their own networks," said Packet Engines' Daines. "They don't have to provision a network by leasing service from the carriers. All they have to do is lease fiber, which is very much like leasing a building." ■

Network World, 161 Worcester Road, Framingham, Mass. 01701-9172, (508) 875-6400

Periodicals postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. Network World (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write Network World at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on the information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Nonqualified subscribers: $5.00 a copy U.S. - $129 a year (except Washington, DC, $136.74); Canada - $160.50 (including 7% GST, GST#126059952); Central & South America - $150 a year (surface mail); Europe - $205 a year (surface mail), all other countries - $300 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. to qualified management or professionals who meet ALL of the following criteria:

1) Have site purchasing influence.
2) Are involved in the purchase of network products and services.
3) Have multi-platform networks installed or planned (including network architectures, LAN operating systems and LAN environments).

POSTMASTER: Send Change of Address to Network World, P.O. Box 3090, Northbrook, IL 60065.

BPA

Reprints (minimum 500 copies) and permission to reprint may be purchased from Reprint Services, 315 5th Ave. N.W., St.Paul, MN 55112 (612) 582-3800.

USPS735-730

Backspin

Laugh, but watch out for Uncle Sam

Q: What do you get when you cross Viagra with Rogaine?

A: Don King.

You need to have a sense of humor to stay balanced in the computer business. After all, we're dealing with large investments that our corporations and, ultimately, our careers rely on. And you need to be able to find the humor in the foolishness, arrogance, pettiness and a litany of other poor behaviors that are rampant in our industry.

Mark Gibbs

Just check out " 'Net Buzz" here to my right. Bon vivant, talented writer and ex-lap dancer Chris Nerney manages to find humor in the most unexpected news events.

Despite these leavenings, I think we have a problem. Whether we have an ability to find the humor in our business, many outsiders take the industry too seriously.

We're a community of people — users and vendors alike — who are extremely talented in the black art of manipulating symbols electronically. Sure, we contribute significantly to the economy, but we're not in charge of it. Unfortunately, the people who don't understand what we do are the first to assume we have more power than we really do.

By way of example, the chairman of the Senate Judiciary Committee, Sen. Orrin Hatch (R-Utah), is probing Microsoft's alleged antitrust activities and has expanded the scope of his inquisition to include the cable set-top box market.

In a recent hearing, Hatch said, "This is much more of a concern to me than the browser issue ever was. . . . Microsoft already controls what 20 million eyeballs see. Set-top technology — if it is successful — has the ability to capture 54 million eyeballs."

Excuse me? Sounds like Mr. Hatch caught a rerun of the movie *Videodrome* — http://us.imdb.com/Title?Videodrome+(1983) — and managed to confuse science fiction with reality.

<digression>

My favorite film synopsis: "Transported to a surreal landscape, a young girl kills the first woman she meets, then teams up with three complete strangers to kill again." — TV listing for *The Wizard of Oz.*

</digression>

Senator, let us be clear, Microsoft doesn't "control" eyeballs. That's like saying Ford Motor Co. controls millions of feet. Internet Explorer is just a vehicle in much the same way that a Ford Taurus is a vehicle.

Once more, we have the government singling out Microsoft as a demonic force that needs to be reined in in the interests of our delicate, undiscriminating, naive and sheeplike culture.

Now, this column is not another polemic in support of Microsoft. Rather, my concern is that the computer industry is being singled out as a target for control. Just consider: The government hasn't got all hot and bothered over whose control systems run Ford's car engines. And it hasn't shown a whit of interest in the complete monopoly of postal meters (Pitney Bowes is the U.S. market owner).

The threat of this inappropriate interest in the computer industry is regulation of a market the government doesn't understand or want to understand.

Mark my words, at the rate we're going with all of the wrangling over key escrow, investigations into Intel and Microsoft, and now set-top boxes, the dogs of government are about to sink their teeth into us. Unless we start to resist the interference and educate the public to support us, we're going to find ourselves restrained, constrained and hamstrung. And that will be no laughing matter.

FUD to nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.

'Net Buzz

The latest on the Internet/Intranet industry

THE ROAD TO RICHES Say what you will about portals and content "plays," but the real money on the Internet is in infrastructure. After all, if the road to your dazzling Web site is strewn with potholes, or the traffic is backed up for miles, or swarms of veterans are trying to make you buy those little American flag keychains while you're stuck at a red light — well, it's not a pretty picture.

Chris Nerney

The shrewd venture capitalists know this. They understand that, first and foremost, someone has to make the packets run on time. That's why a company such as **Resonate, Inc.** continues to draw investment capital from some of the top players in Silicon Valley.

Resonate, which makes enterprise traffic management software, just completed a $9.8 million third round of funding. Joining original investors **Kleiner, Perkins, Caufield & Byers, TechFund, Chase Capital Partners** and **Charter Venture Capital** are new investors **Intel** and **Lehman Brothers.**

The company's line of server products is designed to let enterprises handle high volumes of Internet traffic. Resonate last week also announced it has been awarded a patent for technology that directs traffic on Web sites based on information contained in the URL.

Founded in 1995 by former **nCUBE** executive **Chris Marino,** Resonate is located in Mountain View, Calif.

NO CEO, BUT LOTS OF CASH Intranet information management server start-up **Plumtree Software** may not have a permanent CEO yet, but that didn't stop the company from closing a $4 million second round of financing.

Of course, it doesn't hurt that **National Semiconductor** founder **Pierre Lamond** is acting as president and CEO. Lamond has been a venture capitalist since the early '80s with **Sequoia Capital,** the original stakeholder in Plumtree.

Sequoia gave Plumtree more than $2 million in 1997 and was joined in the latest round by **Hambrecht & Quist Venture** and **Red Rock Ventures,** the venture fund started by **Ernst & Young.**

Based in San Francisco, Plumtree makes an intranet server that uses an electronic card catalog structure (much like **Yahoo's**) to organize and publish information from databases, the 'Net, e-mail, groupware and other document repositories on corporate Web sites.

A group of database engineers from **Oracle** and members of the **Stanford Technology Group** founded Plumtree in 1996. A Plumtree spokesperson hinted that a permanent CEO could be named as early as this summer.

THEY WERE JUST SO 1997 Doom has a way of focusing you, which is the only explanation we have for **PointCast's** sudden realization that its planned initial public offering (IPO) of stock had **Titanic** written all over it.

'Net Buzz wrote on May 25 that PointCast was last year's news, and that the push vendor/money drain was going public now only to cash in on the hot Internet IPO market.

But the market is more discerning than it was two years ago, during the initial Internet Gold Rush, and PointCast undoubtedly felt the bad vibes. This left the company with two choices — perish or sell. Hence CEO **David Dorman's** comments last week that PointCast was pulling its IPO to pursue "significant" merger opportunities. (As soon as he can find some, that is.)

The only significant buyout deal PointCast has seen was the $450 million **Rupert Murdoch's News Corp.** reportedly offered in early '97. We predict PointCast will go for less than $200 million, a pittance for a company that was a star less than two years ago.

Snap out of your midsummer languor and send 'Net Buzz your best Internet- and intranet-related news. Yes, that means you with the margarita in each hand. Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.

Thinergy'98
The World's First
Thin-Client/Server
Computing Conference

Walt Disney World
Swan & Dolphin Resort
Orlando, Florida
September 1–4, 1998

Thinergy'98™

The Citrix Thin-Client/Server Computing Conference

Make plans now to attend Thinergy'98, the world's only event devoted to server-based computing. Hosted by Citrix, Thinergy'98 will offer exclusive training and education with multiple tracks targeted to resellers and end users.

At this first-ever event, you'll hear from key industry and channel visionaries, see the latest thin-client/server products and participate in informative seminars on a wide range of topics including:

- Extending application access to Windows® and non-Windows computing environments including UNIX®, Mac® and DOS
- Deploying, managing and supporting line-of-business applications across corporate WANs and LANs
- Integrating remote users with local system resources
- The final word on the TCO desktop debate
- Over 50 exhibitors demonstrating thin-client/server computing solutions and products in "ThinCity"

Register Now
Don't miss this special opportunity to see the latest in server-based computing, and meet the people who are taking this innovative technology to the next level.

For registration and the latest information, visit:
www.thinergy.com

or call:
1-800-305-5231
(USA)

650-378-1083
(International)

Thinergy'98 co-sponsored by:

3Com · Boundless · COMPAQ · INGRAM MICRO · NCD · UUNET · WYSE · PACKETEER · Tektronix

CITRIX®

Thin-Client/Server Computing

Thinergy'98 produced by: ZD STUDIOS

It's the Best Friend Your Router Ever Had...

The Intelligent Multilayer Switch That Accelerates Your Router's Performance with no Network Reconfiguration

Here's something you and your router can really get attached to—the IMS 1600 Intelligent Multilayer Switch from FlowWise Networks. It eliminates your LAN bandwidth bottlenecks, leverages your router investment and helps you avoid messy network configurations. It's the ultimate buddy system that provides a tenfold improvement in routing capacity, and frees up your router to handle what it's best at—WAN data.

How's it done? Simple. The IMS 1600 includes AutoRoute™ technology that automatically learns the network's configuration from your existing router. You save hours, and avoid downtime and expensive router upgrades. No other switch comes close to the IMS 1600's ease-of-use, wire-speed performance or value! For some very friendly (and useful!) advice on getting the most from your router, call FlowWise today.

FlowWise.

888-595-9473 x250 • 408-474-0385 • www.flowwise.com/autoroute1